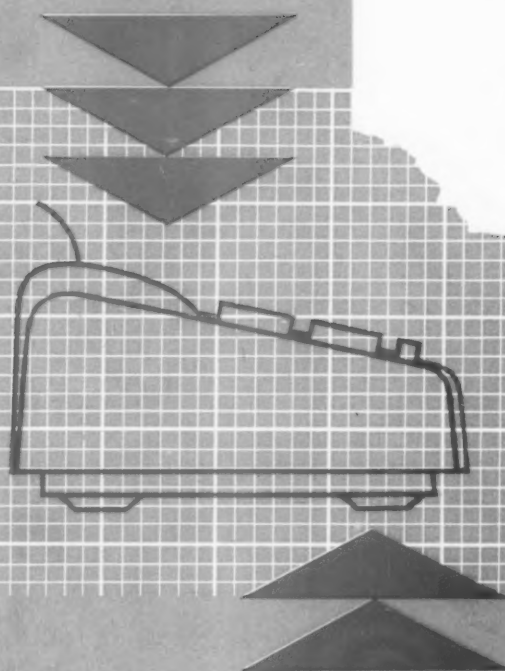


A HITCHCOCK PUBLICATION

assembly & fastener

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APRIL • 1959

In this issue: Clary Builds Reliability at Low Cost

Rotary Air Tool Prepares Tubing for Brazing

Unusual Fastening Techniques for Air Conditioners

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This man is solving a fastener problem
the Pheoll way!



The dependability of Pheoll-engineered fasteners in the jobs for which they are designed results from *two* factors. *First*, the ingenuity of the design men of the Pheoll "specials" team . . . the men who dare to *TRY* for new, more effective solutions! And, *second*, the comprehensive testing equipment that enables Pheoll quality control engineers to accurately determine performance effectiveness *in advance*! Why not put this Pheoll combination of courage and control to work on *your* problem? Phone your Pheoll field representative today. He's your on-the-spot "point of origin" for progressive solutions to old—and new—problems!

THE MAN IN THE PHOTOGRAPH, incidentally, is a Pheoll quality control man . . . *Chief Metallurgist* Marion Longfield, veteran of 33 years of progress . . . at Pheoll!



Pheoll Manufacturing Company

Industrial Fastener Division

5700 WEST ROOSEVELT ROAD
CHICAGO 50, ILLINOIS

assembly & fastener ENGINEERING

April, 1959

Volume 1, Number 7

FEATURES

Wanted: Tax Depreciation Reform 7

Chrysler's Frank Olds laments outmoded depreciation policies which have not kept abreast of the speed of technology

How Clary Builds Reliability at Low Cost 22

Reliability was a practical necessity when Clary engineers went to work on a new model adding machine.

Fastening Techniques for Air Conditioners 28

Serviceability and corrosion are among the problems licked by Drayer-Hanson with some different techniques, including use of magnets as fasteners.

Air Tool Prepares Tubing for Brazing 37

Two simple rotary devices applied to an air-tool do the trick at the Norge refrigerator plant.

Fast Bearing Collar Assembly at SKF 41

Automatic screwdriver inserts set screws in collars at rates up to 1200 an hour.

Quarter-Turn Fasteners in Product Design 45

Properly applied quick-release fasteners can provide rapid servicing without special tools.

DEPARTMENTS

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• An office appliance such as an adding machine has to stay sold under normal service conditions. If service is required, it has to be kept simple and economical. To see how Clary builds reliability at low cost, turn to page 22.



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Letters to the Editor

Proper Torque

In your February issue there appeared an article entitled, "What Is Proper Torque?" I would like to have a reprint of this article, if available. Our factory personnel have noted this article as being outstanding in its treatment of this subject.

J. A. Arney
 District Manager
 Aro Equipment Corp.
 Bryan, Ohio

I would appreciate receiving five copies of the enlightening article, "What Is Proper Torque?"

R. M. Smith
 Nortronics
 Hawthorne, Calif.

Who If Not You?

Anticipating the merit of the "One Last Word" in January, I circulated our departments for perusal. The comments were favorable, and I was urged to request several "Who, If not You When, If Not Now?" cards.

R. L. Johnson
 Design Checker
 Oliver Corporation
 South Bend, Indiana

Ultrasonic Welding

The article on "Ultrasonic Seam Welding" in January seemed very interesting. Is it possible to obtain further information on this process?

A. E. Wilcox
 Master Mechanic
 Modern Industrial
 Engineering Co.
 Detroit, Michigan

We are very interested in the subject "Ultrasonic Seam Welder Joins Dissimilar Metals . . ."

Fred H. Zimmerman
 New Product Development
 Ternsted Division
 General Motors Corp.
 Detroit, Michigan

Rivet Applications

Please send tear sheets of "Let's Consider Rivet Applications", page 32, and "Technical-ities", page 56, January issue.

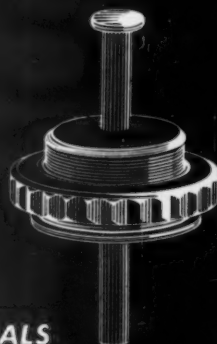
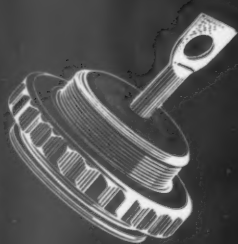
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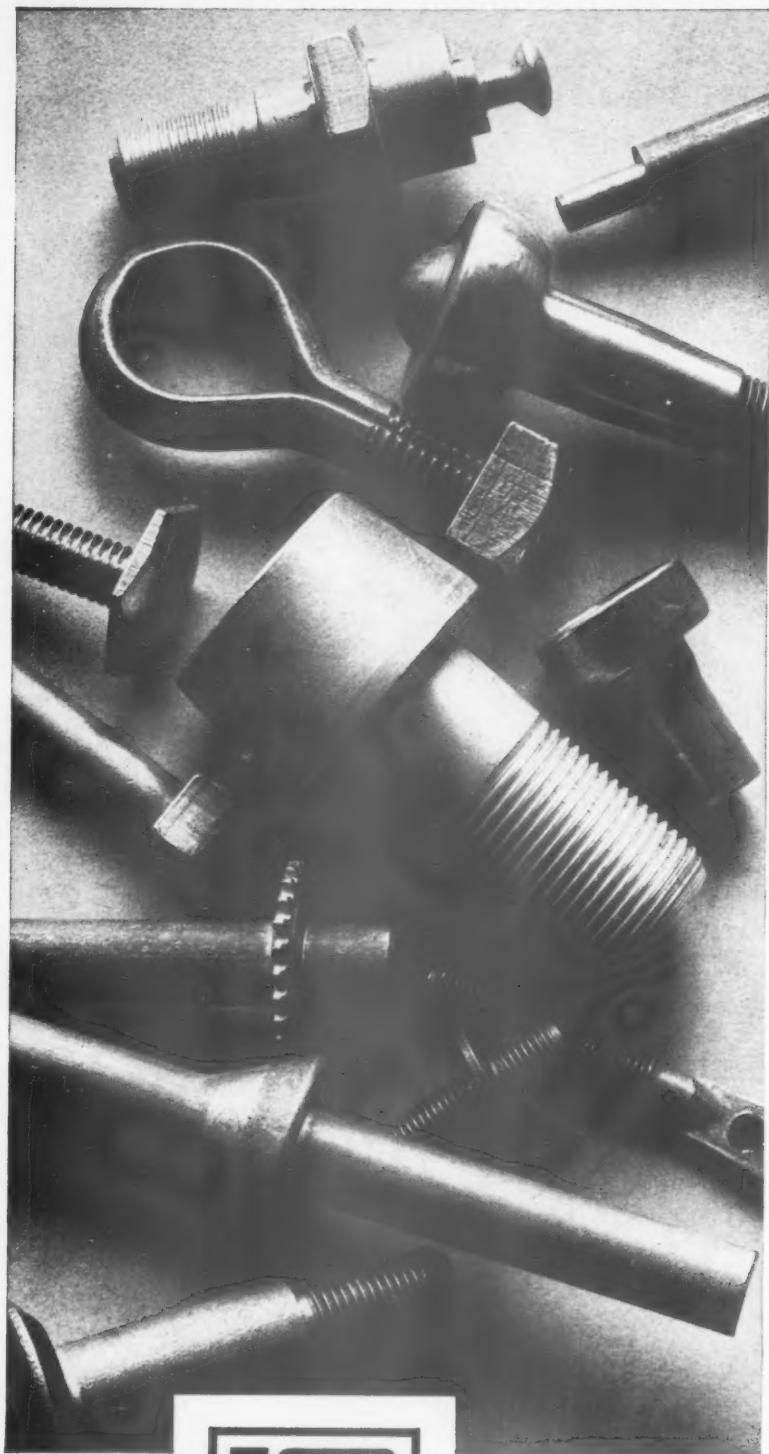
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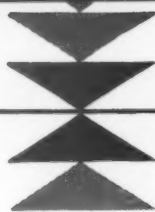
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Assembly and Fastener Engineering



THE EDITOR'S VIEW

APRIL, 1959 VOL. 1, NO. 7

LOW ENGINEERING ENROLLMENT AGAIN, WHY?



Here we are on the threshold of the Sensational Sixties which hold a promise of unbounded prosperity, and we hear the depressing news that enrollment in engineering schools is again on the decline.

College students are shying away from engineering again. The freshman class which entered our 153 accredited engineering colleges last fall was 11.6 percent smaller than the previous year.

By 1962, or even sooner, industry will be faced with the prospect of engineering graduates doing the interviewing and setting the terms of employment. This in turn will be followed by outright pirating of talent.

Who's responsible? Who scared our talented high school graduates out of taking engineering courses?

Let's go back to the summer of 1957 when industrial activity slackened almost overnight. One of the largest companies in America had its engineering departments working six days a week. Suddenly the work week was cut to five days, and shortly thereafter several hundred engineers with only a few years of service were cut adrift.

This is not an isolated case. It happened all over the country. The word got out that engineers were a dime a dozen, and that the profession was overcrowded and should be avoided like a plague.

Just what were top management

"leaders" thinking of? Where were the brains that were charting the business of the future?

Instead of passing out corporate dividends at record earning rates, why weren't these men devising ways to keep their young engineers on the payrolls, cutting the workweek of everybody if necessary.

Instead they pushed the unemployment button, with the resultant bad publicity from the thousands of engineers frantically looking for work.

Now, industrial activity is starting another climb, and engineers are again being courted with favor. But the damage has been done.

High school graduates can't help but wonder about a profession which finds the younger men cut loose with dips in the production curve? Their parents can't help but wonder about advising them to study engineering.

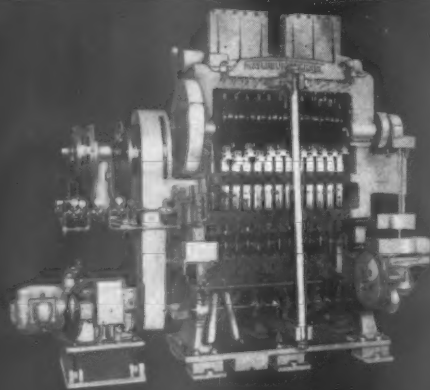
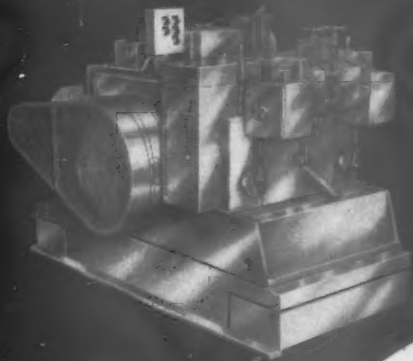
What's the answer? Somehow the leaders of our large companies must redeem their actions, and grant assurance that the drastic panic measures of 1957 will not recur.

There is no other choice if we are to have the engineering manpower to cash in on the many opportunities ahead, much less to keep the Russians from surpassing us in our pet preoccupation with the highest standard of living in the world.

Orville E. Skene

Managing Editor

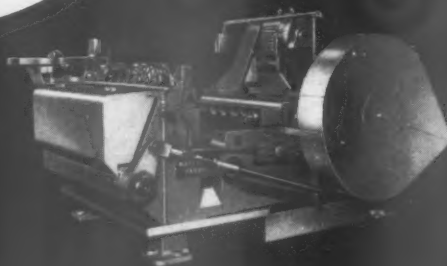
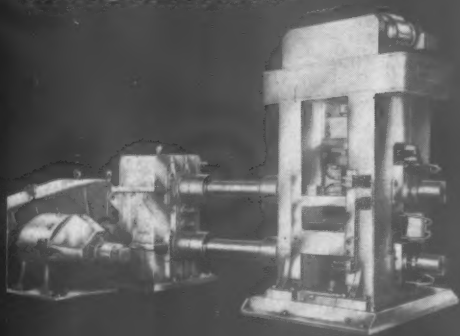
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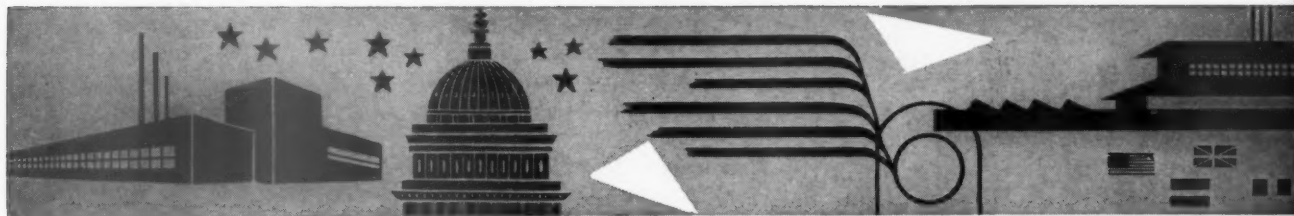
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WF 57

The State of Business



WANTED: TAX DEPRECIATION REFORM!

What is needed today in Washington is a clear understanding that present tax policies are causing serious capital erosion all across the industrial landscape. Contributing to this eating away of funds is the fact that tax depreciation allowances are being spread over too long a period of time. Depreciation policies have simply not kept abreast of the speed of technology.

From the Chrysler Corporation let me draw an illustration. Only seven years ago the DeSoto engine line was one of the show pieces of the entire industry. Engineers from other companies and even from European factories considered this plant to be the last word in engine-building equipment. Two years ago that plant became obsolete and had to be completely replaced.

Now no one questions the need to keep up with technological growth. The individual company must keep pace or go out of business, while in a larger framework, the advantages to the nation as a whole are immense. It is investment in new and more efficient equipment that fundamentally creates new and better products as well as increased productivity. And increased productivity is the only sound and non-inflationary basis for raising wages and salaries. A stabilization of product costs and a soundly based improvement in the wage structure widens markets and contributes to the growth of the economy. This sound economic base makes possible an adequate defense, an adequate investment by the country in education, roads, research, foreign aid and other tools of civilization.

To achieve these benefits through modernization, which usually means the replacement of obsolete machinery and other equipment at the rates demanded by the ever-increasing speed of technological development, sizable capital is required.

In theory it may be argued that depreciation allowances are not an actual source of cash for replacing obsolete facilities since the only real source of funds is current revenue. The truth of the matter

and the really important consideration, however, is that current revenues are being taxed on the basis of restrictive and unrealistic depreciation policies laid down 25 years ago. These policies have been undergoing a slow reform but they have not yet caught up to reality.

Government officials are beginning to recognize this fact. But they are not as yet giving it due emphasis in their decisions. Neither are they recognizing that it takes far more money to buy the new machines than it did to buy the ones they replace. Even though the newer equipment is more efficient than the old, it still costs, on the average, much more per unit of production than the older equipment.



FRANK V. OLDS

Assistant Comptroller
Chrysler Corporation

A Chrysler accountant since 1926, F. V. Olds has been a director of the Detroit Chapter of Tax Executives and is on the U.S. Commissioner of Internal Revenue's Advisory Council.

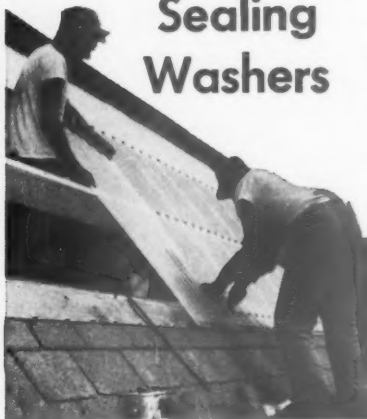
Replacement is no longer a matter of buying a new machine similar to a machine that has worn out. Most of the productive equipment in the present-day mill factory or refinery becomes obsolete long before it wears out. The life of machinery today is determined by the pace of technological progress—not by the length of time it takes to tire out a piece of iron.

The built-in factor of higher replacement cost caused by inflation must be taken into account. What this means is that you can't replace an old machine with a new one just by recovering the cost of the old one. The fallacy of basing depreciation on original cost should be plain enough for all to see.

The net effect of all this is that companies are

continued

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If you want to get rid of fastener leakage problems standardize on BARTITE Sealing Washers . . . write for samples and Bulletin B-101 today.



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State of Business, continued

being forced to overstate taxable income and tax liabilities, and this means a dangerous erosion of capital, which in many cases should be going into the replacement of obsolete facilities. Many companies do not have sufficient funds for this purpose and must resort to borrowed funds which may or may not be available. The result is a slow down in industrial growth.

Most people know that corporate income is taxed at a rate of 52%. What is less generally known, however, is that the taxable income to which the statutory rate applies is greatly overstated. The rate at which many companies are taxed can be as high as 80%.

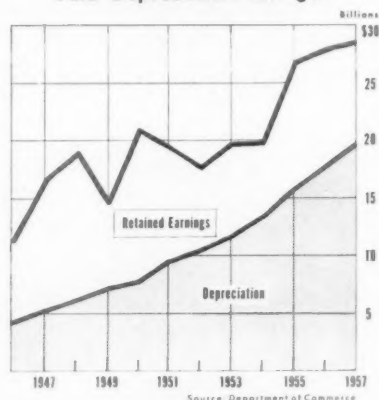
Overstatements of income is principally caused by the fact that the Treasury does not allow adequate depreciation allowances to be charged against current income. Allowances are inadequate for two reasons: first, depreciation allowances have been spread over too long a period of years; second, depreciation is tied to the original cost of equipment, not to current replacement cost.

The simplest solution, and in my opinion the soundest in the long run, would be to permit taxpayers to use the same equipment lives for tax purposes as they use for their own bookkeeping.

Continuous controversy with the Internal Revenue Service would be eliminated by this approach and it would do away with the uncertainty now facing business on depreciation allowances. As far as the effect of this policy upon tax revenues is concerned, I believe that it would have no damaging results.

Notes in the News: Feeling their oats, American Motors is giving all station wagon buyers a free chrome roof-top travel rack. A record 37,000-plus Ramblers came off the line in March. Production is topping sales though the auto industry and sagging credit sales may result in a figure closer to 5 million 1959 sales, which would have to increase 30% to reach the hoped for 5.5 million for domestically-produced cars . . .

Corporate Retained Earnings And Depreciation Charges



Since the end of World War II, depreciation has become more important than retained earnings as a source of funds to corporations.

Eastern Republican Senators Butler (Md.), Keating (N.Y.) and Javits (N.Y.) are leading a drive to prevent California from increasing its 21.4% share of prime missile contracts worth \$8 billion, plus \$1.3 billion in sub-contracts. Eastern manufacturers Martin, Republic and Fairchild are operating far below capacity . . . Steel output is still booming, with Inland showing the way at 95% of capacity . . . Final electric appliance figures show '58 increases in disposers, dishwashers, water heaters, freezers of 301,000 units, losses in refrigerators and ranges of 244,000 . . . A new order backlog of 3.4 to 3.7 months for cutting and forming machine tools is the most encouraging since pre-recession times but still not-too-bright . . . Ike will veto the \$2.6 billion housing and \$465 million airport bills if they reach the White House, say insiders. The Senate will override, the House sustain . . . RR car loadings through first eight weeks of '59 saw 4.2% increase over depressed '58, still off 15% from like '57 period . . . The 'battle of the budget' rages with Capitol Hill mail heavily behind Administration . . . 1230 universities have applied for \$62 million in the Government student loan program, an overwhelming response . . . No state takers yet for \$350 million Federal funds available for those who restrict billboards along interstate highways.

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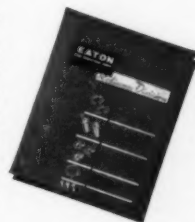
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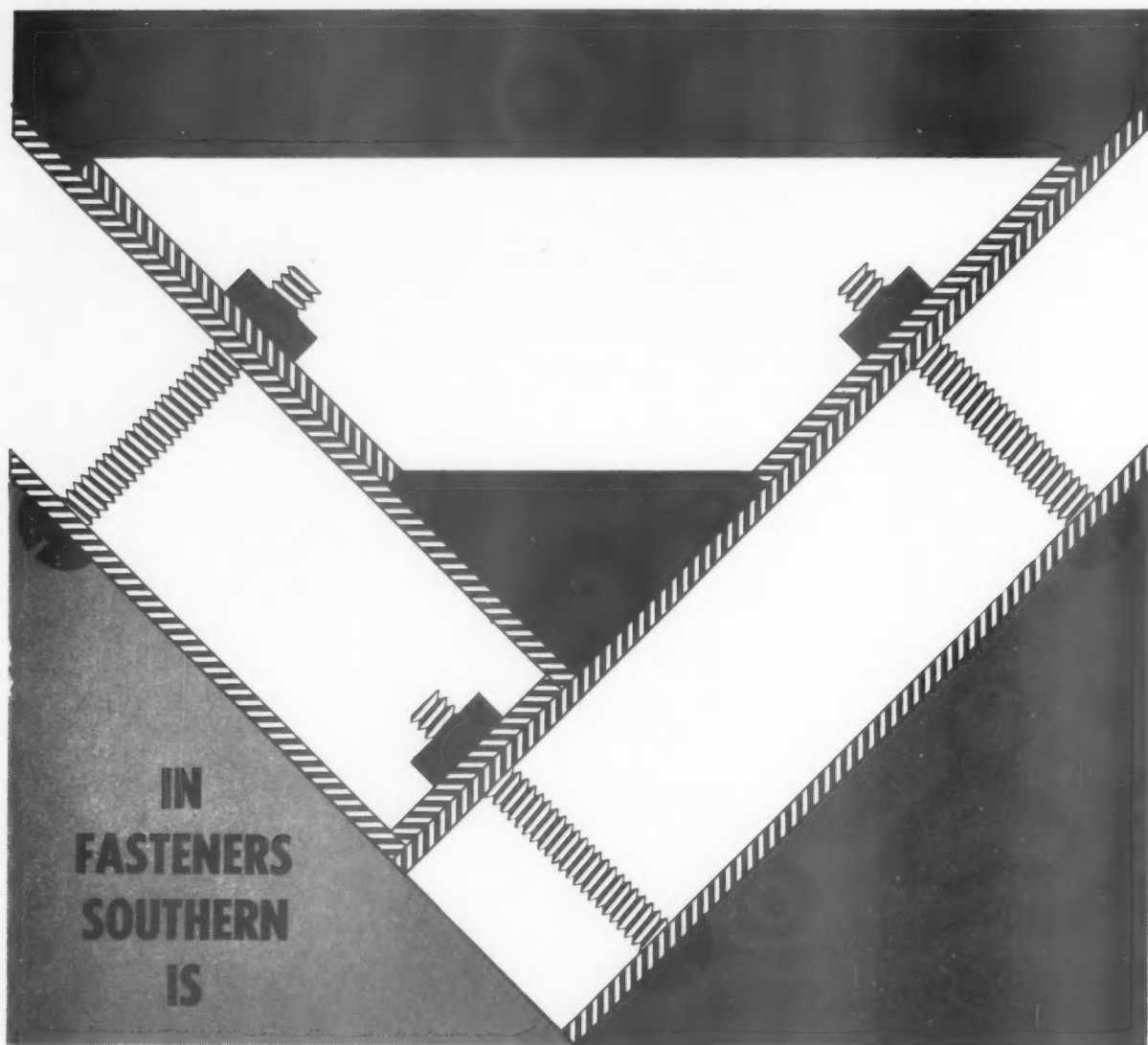
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Assembly and Fastener Engineering

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Thirty-two pounds of airborne digital computer of most advanced design has been introduced by Librascope, Inc., of Glendale, Calif., to accurately solve the most complex navigational problems in a fraction of a second.

The ultra-lightweight computer accepts inputs from both present as well as planned navigation aids to provide self-correcting dead-reckoning and celestial navigation. One of the most flexible digital airborne computers available for navigational purposes today, the unit's key feature is its capability of accepting new navigational aids as they are developed. The computer can serve as the prime module for military and commercial navigation systems. Besides its navigational role in high performance aircraft, it is also suited to guidance functions in missile systems, mainly due to its degree of adaptability to inertial, Doppler and celestial sensors.

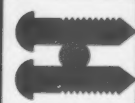
The AN/ASN-24 is a two-address, serial, binary data computer with digital impulses stored as 25-bit words on a 6000 rpm memory drum. The drum has 32 channels, each one holding 64 words, which provides a total storage of 2048 words.

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Industry at Work, continued

Typical information recorded on the drum would be magnetic variation. Magnetic deviation for the plane's compass may be stored as a function of heading.

Actual computation errors of the AN/ASN-24 are less than 0.1%, compared to values up to 2% for existing analog navigation computers. Position of the aircraft can be continuously checked against navigation aid inputs to "fix" the dead reckoned position.

GE TO TEST MACHINERY WITH NUCLEAR RADIATION

"There is very little information on how equipment will operate under moderate or low radiation doses over long periods of time," said Dr. G. W. Dunlap, in outlining the purpose of a new \$1.5 million General Electric radiation laboratory.

Machinery and equipment up to telephone booth size will be studied while in operation in the Schenectady, N.Y. radioactive-cobalt chamber, largest of its kind known.

Nuclear bombardment up to 500,000 roentgens an hour will be administered from two 15' high accelerators. Inside the room, 10,000 curies of "Cobalt 60" are contained. Viewing is done by closed-circuit television.

Earlier similar studies led to development of a new-type electrical insulation, first industrial product of nuclear bombardment.



GE's laboratory managers J. F. Young (right) and G. W. Dunlap study an "atom smasher," among new radiation study facilities.

SYLVANIA MANUFACTURES ONE MILLIONTH LAMP



P. F. Cameron, manufacturing manager, is passing the one millionth Tru-Focus projection lamp to Sylvania president F. J. Healy.

Sylvania Lighting Products celebrated the third anniversary of the introduction of its Tru-Focus projection lamp by producing its one millionth lamp recently in Salem, Mass.

Designed with the filament precisely mounted with respect to base and socket and capable of burning in any position, the lamp's brilliance and economy has revolutionized color-slide and motion picture projector styling. The low-silhouette models are built around the 4" high lamp.

Sylvania executives look for growth in 1959 over the present one-third of the market.

President F. J. Healy called the lamp "an additional spur to the growth of the \$18 million amateur movie market."



A technician gently lowers radioactive cobalt to its storage place 16 feet below water when not in use for tests.

Assembly and Fastener Engineering



The case of **THE ALMOST PERFECT DESIGN**

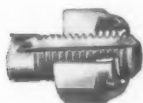
This is a closeup of an equipment failure. Somewhere in the basic design, someone forgot to specify a nut that would hold fast. Now the entire piece of equipment is idle. Does it matter how good the overall design is?

The most brilliant engineering concept can be obscured or cancelled out by the failure of components. In the final analysis, then, a design which does not include fail-safe performance for the benefit of the user—and the protection of the maker—is inefficient and uneconomical. In the eyes of the customer, a failure of the smallest part is failure of the unit.

For bolted connections, it is possible to obtain "design insurance"... an extra margin of operating dependability that can mean the difference between satisfaction and a field breakdown... by specifying an Elastic Stop® nut

with the failure-proof red nylon locking insert. The nylon insert will not destroy bolt threads or finishes; it is non-galling; it will withstand severest vibration, shock and impact loads; and it can be re-used over fifty times on a bolt of standard quality.

ESNA offers a broad line of standard and thin height hex nuts, and a size range from 0-80 to 3". Also many special configurations to solve your unusual design problems. For detailed information and photos showing how the designs of some of America's foremost manufacturers of heavy equipment have utilized Elastic Stop nuts for critical bolted connections... write to Dept. S32-497 Elastic Stop Nut Corporation, 2330 Vauxhall Road, Union, New Jersey.



DOUBLE DEPENDABILITY

The dependability built into every Elastic Stop nut builds itself into the dependability of every product on which it is used.



ELASTIC STOP NUT CORPORATION OF AMERICA



... the two-way answer to fastening problems

Here's a combination that slashes production costs and gets rid of fastening problems in a hurry—Milford Rivets made to high-quality standards to assure a better finished product for you . . . Milford automatic rivet-setting machines that can be adapted to your assembly needs.

For the answers to assembly problems . . .

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Assembly and Fastener Engineering

Assembly and Fastening Ideas

GE SPEEDS MOTOR ARMATURE SOLDERING

A special system is used in soldering armature coil leads to commutator bars for traction motors at General Electric's Apparatus Service Shop in Chicago. More than 50 connections can be soldered in one operation within 10 to 15 minutes, a 50% speedup, according to J. E. Miller, shop manager.

Pure tin solder is melted in a reservoir pot by three over-the-side immersion heaters rated 1500-watts each. The molten solder is passed through a trough to four 1000-watt, cast-in immersion heaters in the soldering ring. Amount and rate of solder flow in the ring is operator controlled by lowering or raising a cylindrical displacement weight in the reservoir.

Adapters are inserted in the soldering ring; the armature is pre-heated to 300°F. The commutator end of the armature is then lowered into the ring and the connections are automatically soldered.



A traction motor armature is being lowered into soldering pot at GE's service shop in Chicago. The new system has reduced soldering time 50%.



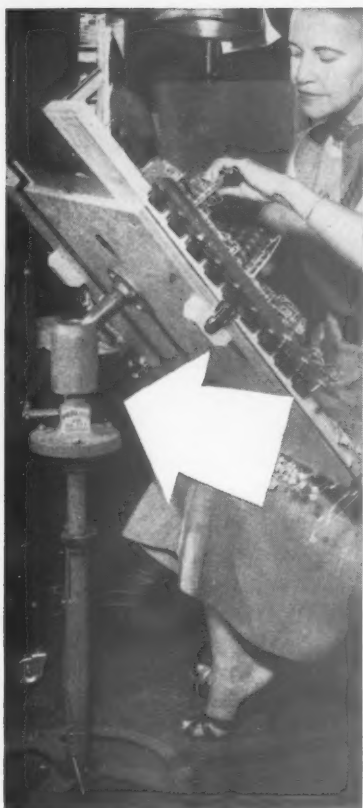
SIGMA WELDING CUTS REACTION COIL COSTS

Mechanized Sigma welding is doing an impressive job for the Hilton Products Co., Seattle, Washington fabricators of reaction coils for the chemical industry.

This high-speed, inert gas process, reports H. S. Hilton, owner, has saved 50% on overall production costs over previous manual welding methods, reduced weld distortion, minimized clean-up and boosted production speed by over 300%. Engineer C. C. Ferguson says the welding rate is 60 inches per minute.

Reaction coil parts are made from 316 ELC, schedule 10, stainless steel pipe. To join the 6" diameter pipe, Hilton uses an SWM-2 Sigma welding machine, equipped with an HW-13 torch and mounted on a Linde OM-48 side-beam carriage.

continued

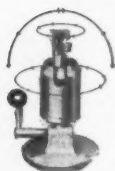


POWRARM IN . . . PRODUCTION GOES UP! UP! UP!

FRIDEN CALCULATING MACHINE CO. INCREASES WORKER EFFICIENCY WITH PowRarm! By using Wilton PowRarm Work Positioners as the basic unit of adjusting assembly boards, Friden increased production through a savings of operator time, motion, and assembly space. PowRarm allows 360 degree rotation of the new boards, and workers can incline them at various angles. May be mounted in benches, conveyors, or floor stands as illustrated. Many firms use PowRarm for inspection, servicing, soldering, assembly, and any work positioning operation. Ask your Wilton distributor for a demonstration.

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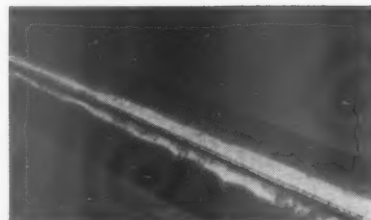
AFE 49

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Assembly and Fastening Ideas, continued

Welds are made with Oxweld No. 316 stainless steel wire, 3/64" diameter, at a current setting of 200 amp., 28 volts, DCRP. A flow of M-5 argon prevents weld contamination.

With its high speed, high quality and complete mechanization, the new application, say Hilton engineers, is "virtually problem-free."



Sigma welded at rate of 60 inches per minute, 6" diameter of stainless steel pipe is part of a reaction coil.

ELECTRON BEAM WELDER JOINS REACTIVE, EXOTIC METALS

A new electron beam welder successfully joins reactive and high-melting-point metals used extensively in critical missile and atomic reactor applications.

Designed and constructed by Air Reduction Company's Central Research Laboratories, Murray Hill, N.J., this welder applies a high intensity electron beam to weld beryllium, molybdenum, tantalum, zirconium, hafnium and

all other exotic metals which before this could not be welded satisfactorily, or were very difficult to weld by conventional techniques. Application of the process will require custom built equipment for specific jobs.

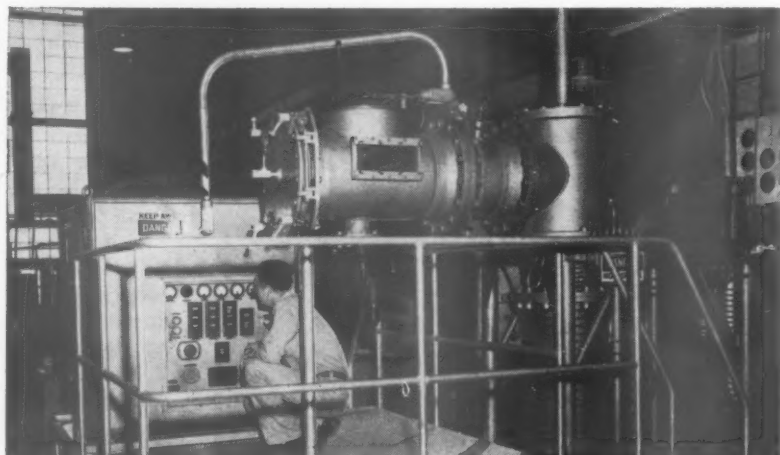
The electron beam bombards the materials to be welded in a very high vacuum chamber.

The use of a high vacuum makes it impossible for the metals to be contaminated by the atmosphere during the welding process, a necessary condition for the effective welding of reactive metals. In fact, many of the contaminants that might be present in the original work pieces are removed during the welding process.

The size of the electron beam, as small as 1/16" dia., can be controlled to a degree previously unattainable. Resultant welds are stronger, more ductile, and have improved contour.



Interior view of high vacuum chamber showing test materials being electron beam welded.



An Air Reduction research technician prepares new electron beam welder for further tests. The machine joins exotic metals, sealed in a high vacuum chamber, by bombarding the materials with an electron beam, as small as 1/16" in diameter.

COLORING PROCESS CODES PLASTIC ASSEMBLY PARTS

The problems usually associated with coding plastic parts for assembled products have been solved by a new coloring process recently developed by Colorite Industrial Dyers, New York City specialists in the dyeing of plastics.

The procedure followed in the plastics industry is to actually mold the parts in the necessary colors. This requires the use of colored resins which are prepared by adding dry coloring agents to the natural resin. In addition, each part which is to be of a different color must be molded separately. Thus, color coding by the usual methods entails two cost factors: the cost of the colored resins and the cost of molding.

By the new process, both of these problems have been eliminated. First, the parts may be produced in the colorless natural plastic and dyed to specification. The manufacturer saves the difference in cost between natural and colored resins and also eliminates a portion of the cost of the material lost in gates, runners, sprues, etc.

By molding in natural colors only, "family" molds—multi-cavity molds in which the various cavities yield components of an assembly—may be used, providing tremendous savings in mold costs and economical production of smaller quantities of each part required.

By means of its specially formulated dyes and application process, Colorite colors plastic parts without affecting tolerances or the properties of the plastic. Even threaded parts have been colored without affecting the tight fit required. The colors comply with RETMA color coding standards as specified in GEN 101A.

Since the coloring of parts is done after molding, by the new process, manufacturers desirous of color coding can take advantage of economies made possible by the use of "family" molds.

At the same time, the lower costs permit color coding of each individual part of a unit to be assembled regardless of the quantity involved.

AT *Chicago Rivet* ALL 3

will reduce your Fastening Costs

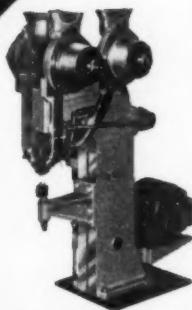


rivets

**Semi-Tubular,
Split and Shoulder**

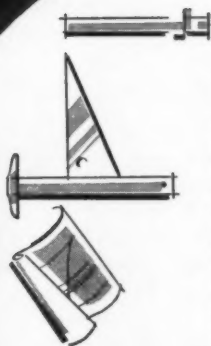


You avoid machine down-time because every semi-tubular, full tubular, split, shoulder or special rivet is precision made and hand inspected to assure free, non-clogging movement in automatic setters.



rivet setters

Your fastening costs are less because Chicago Rivet makes machines that set from one to seven rivets at a time. Riveting is automatic and may involve the use of special indexing fixtures, adjustable riveting centers, and top or bottom rivet feeding and other mechanisms, controlled by solenoids or air cylinders or both.



engineering

The recommendations of Chicago Rivet Engineers are most valuable. Their knowledge of rivet fastening techniques, gained from solving thousands of manufacturers' fastening problems can help make your product more competitive. Calling Chicago Rivet is a habit-formed procedure with many companies. You incur no obligation when you use the service of Chicago Rivet Engineers. Send a blue print or sample assembly with your inquiry.

Chicago Rivet & MACHINE CO.

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New Rivet Catalog contains engineering data, list of popular semi-tubular, full tubular, split and shoulder rivets and popular automatic rivet setters. Write for copy.

Speed up

and

RIVETING and CLINCHING

**Automatic feeding
and setting with**

T-J

You'll realize *faster assembly . . . reduced labor costs* immediately, when you use T-J Rivitors and Clinchors for your production line. These performance-proved machines are designed to do a wide range of assembly jobs for aircraft, automotive, farm machinery—riveting jobs of *all kinds*.

T-J RIVITORS automatically feed and set solid rivets with high production. Electrically powered Rivitor sets solid steel rivets up to $\frac{7}{8}$ " long. Throat depths 8" to 36".

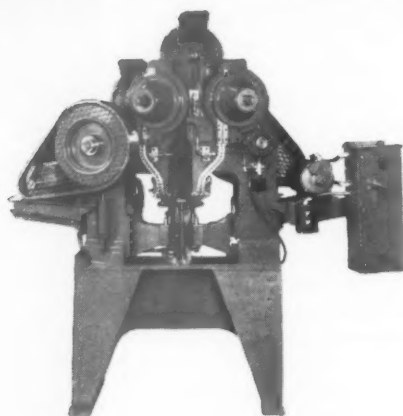
T-J CLINCHORS set clinch nuts with fully automatic operation, controlled by a single foot pedal. Available in Underfeed and Gravity Feed models, throat depths 8" to 36".

Send today for these helpful references: Rivitor bulletins 646 and 555 . . . Clinchor bulletin 555. The Tomkins-Johnson Co., Jackson, Mich.

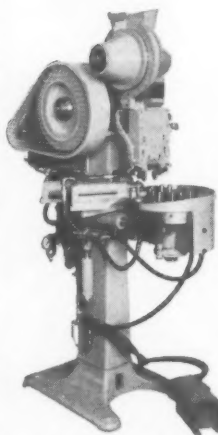


TOMKINS-JOHNSON

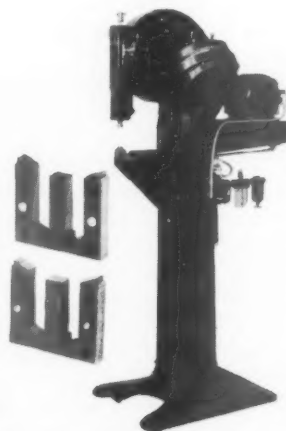
RIVITORS, AIR AND HYDRAULIC CYLINDERS, CUTTERS, CLINCHORS



RIVETS 4 AT A TIME! Special quadruple riveting unit, incorporating two Model "RR" Twin Rivitors, mounted on a special welded steel base. Equipped with air-operated hold down mechanism and a safety air trip arrangement. Toolled for riveting left hand and right hand automotive muffler bracket assemblies.



SPECIAL TWIN RIVITOR! Toolled for 6 station indexing fixture, incorporating automatic clamping and ejecting mechanisms, for riveting laminated armature assemblies.



T-J CLINCHOR adapted to a wide range of clinch nut setting problems. Gravity Feed model shown here.

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REPORTS FROM THE FIELD



SILVER SOLDERING SOLVES TRICKY BOEING 707 CONDUIT JOINING PROBLEM

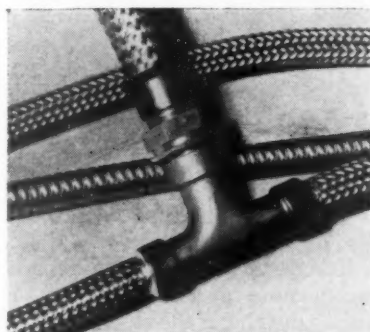
How could thick stainless steel fittings be best joined to thin stainless steel braided wire?

This question faced the aircraft service shop department of General Electric in Seattle, Wash., designers of the electrical wiring harness conduit which carries power to the landing gear actuator motors on the Boeing 707.

Why a problem for engineers Warren Patrick and Al Jurrens? Flame from a match will heat a very fine wire red hot in a few seconds. But it won't warm a spot on a much heavier piece of metal. This was the problem—thick and thin, fine and heavy—heat to join, but not to damage.

The need was for a strong alloy with high capillary that would join stainless steel at a (low) temperature which would not damage either the wire or thin-walled conduit.

Several methods were tried and rejected before Welders Supply suggested All-State No. 430, a silver-bearing stainless solder.



A silver-bearing stainless solder effectively joined this harness and fitting, part of the Boeing 707's electrical wiring system carrying power to the landing gear motors.

Its features included thin-flowing; average strength on stainless steel above 10,000 psi, both tensile and shear; and its ability to hold against 2400 lbs. pull at temperatures up to 300°F.

Conventional methods had to be revised to produce an aircraft-quality joint. With an ingot of solder heated to fluid state at 430°F, the parts were fluxed, dipped in the pot and allowed to tin. Then components were assembled while hot and brushed with air-acetylene torch flame to knit the joint. More solder from wire form was added to make the fillet.

Flexure tests of 50,000 cycles turned up no failures.

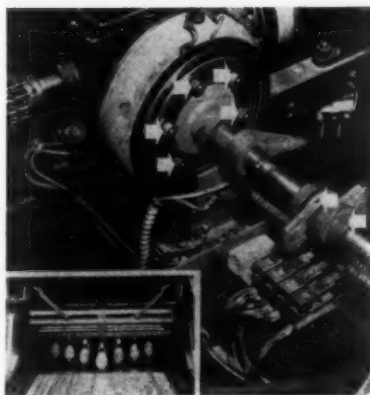
BOLTS SECURED BY VIBRATION-RESISTANT SEALANT

Critical fasteners in Sherman automatic pin setters are now being secured against loosening due to vibration.

The once-troublesome problem was solved by using American Sealants' Loctite, a thin liquid plastic that hardens only when confined between closely fitting metal parts.

After satisfactory test results were shown in the plant, all fasteners in pin setters used at the National Duckpin Bowling Tournament were treated with the sealant. Twenty-four setters were in use steadily for three weeks, operating 18 hours a day, seven days a week.

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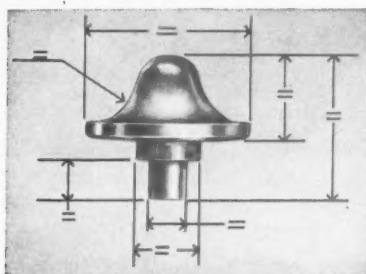


Catalytic action of the metal surfaces, minus air, causes liquid sealant to bond fasteners in this automatic bowling pin setter.



Manufacturers of
Cold Headed
Fasteners
Since 1888

OVER **10** TIMES
THE RATE
AT **50%** SAVING
IN RAW MATERIAL



Another example of how
Hubbell Cold Heading
produces Better Parts at
Faster Speeds, at Lower Cost

THE PART:

Click Button

THE MATERIAL:

Brass

THE METHOD:

Hubbell cold heading in place of screw machining.

THE RESULT:

This brass click button was machined previously from bar stock, involving several different operations that removed nearly 50% of the total weight of the original stock . . . a wasteful, time-consuming, costly process.

Hubbell now produces essentially the same part at tremendous savings in time and material cost.

a. Production is increased from the original rate of 5.5 pcs. p.m. to cold heading rate of 60 pcs. p.m.

b. Labor, overhead and material cost has been reduced 36%.

c. The finished part is stronger, more accurate, with greater uniformity.

Hubbell Cold Heading may provide equally dramatic results for you. Whether it is presently cold headed or not, send blueprint of part or sample for analysis and estimate.

HARVEY HUBBELL, Inc. Machine Screw Dept.
Bridgeport 2, Connecticut

Kindly estimate on the enclosed
sample (blueprint) Quantity _____

Name _____
Title _____
Company _____
Address _____

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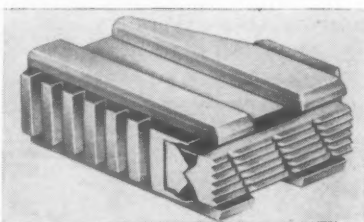
Reports from the Field, continued

According to Raymond P. Nurse of Sherman Enterprises, "Mechanical breakdowns attributable to loose fasteners were negligible."

Presently all Sherman units being assembled by Crompton & Knowles use the product.

RUBBER-TO-METAL BOND SIMPLIFIES CHUCK DESIGN

A unique rubber-to-metal bond makes possible a simple design for an improved chuck, developed for its pipe-threading machines by Oster Mfg. Co., Cleveland. The flexible rubber connection between chuck body and the gripping part of the jaw makes possible a self-energizing grip action, eliminating the need for hammering to establish a grip on pipe being threaded.



Complete pipe machine chuck jaw shows the replaceable insert.

Chucks of this type have three jaws 120° apart, moved in and out radially, to grip or release pipe, by turning a handwheel which forms the rim of the chuck.

Sufficient grip cannot be established by simply turning the hand-wheel, any more than a nail can be driven by pressing a hammer against it. The handwheel on conventional chucks is turned until serrated jaw ends contact the pipe. Then the wheel is backed off to retract the jaws a bit, and slammed forward to hammer the serrations into the pipe. Several such blows may be necessary. A positive grip is not always es-

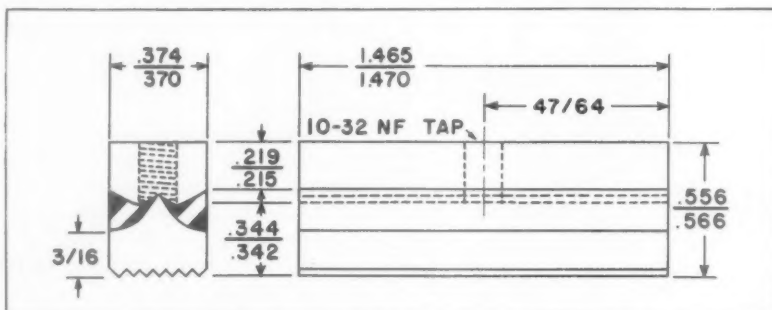
tablished, the pipe may be unnecessarily scarred, and the hammering procedure causes destructive shock and rapid wear to the chuck mechanism. Therefore, self-energizing chucks have been designed.

Such chucks operate on the same principle as a pipe wrench, which has one jaw free to rock slightly and grip pipe in opening.

Oster conceived a design in which the jaw ends and bodies are joined by rubber, instead of the conventional springs, bonded to each of the two pieces of metal. The two pieces are successfully bonded together by Ohio Rubber Company, despite problems occasioned by the small size of the pieces, the difficult service conditions which the parts encounter, and the requirements for strength and flexibility.

The area of the two surfaces to which the rubber is bonded totals only 1.53 sq. in., and the total volume of rubber in each piece is only 0.003 lb. No jaw has yet failed in service.

A special Neoprene compound was formulated paying particular attention to adhesion qualities, resistance to the oils in threading compounds, and ability to retain strength and flexibility over a temperature range varying from those of outdoor use in winter to those of hot environments such as boiler rooms. The rubber has a



The heavy cross-hatched area represents the rubber bond in this chuck jaw insert made for a self-energizing Oster chuck.

Assembly and Fastener Engineering

Durometer hardness of 40, to give the proper degree of flexibility.

Oster machines the pieces from tool steel and heat-treats them to 53 Rc. Ohio Rubber positions several pairs of parts with rubber between them in a precision mold, after coating them with cement. Then the mold is closed and the rubber and steel are bonded under heat and pressure. Although assemblies involving rubber cannot normally be held to tolerances customary in metalworking, this chuck jaw insert assembly is produced to the dimensions and tolerances shown, including plus or minus 0.005" on over-all height.

AMERICAN PLASTICS MAKES LONG-WEARING NYLON HINGE

Writers of ghost stories . . . may soon lose a favorite device for setting an eerie atmosphere . . . the "squeaky hinge" is on its way out.

A silent, non-sticking all-nylon plastic hinge, developed by American Plastics Corp., a Heyden Newport Chemical Corp., subsidiary, will require no lubrication and is expected to outwear its conventional metal counterpart many times.

Since it is produced from nylon . . . (polyamide) plastic, this non-stick hinge can be hammered without shattering, immersed in boiling water without distortion, subjected to sub-zero temperatures without embrittlement, exposed to corrosive chemicals without attack, opened and closed repeatedly without noticeable wear, used in assemblies where minimum weight is mandatory, and produced in color, shape, or finish to meet any hinge design needed.

The new hinge has a unique, virtually one-piece design. Unlike conventional hinges, there are no pins. The mating halves are molded together inseparably. No assembly operations are required other than fixing the hinge to the mating sections.

Of advantage to all fastening uses, the hinge's low coefficient of friction and high impact strength permit virtual unlimited opening and closing, points out Dr. Herman Sokal, president of American Plastics.



The smart move is to **HUCK** FASTENERS

Comments of regular users of HUCK FASTENERS tell the story.

"70% saving in our assembly cost".

"50% faster than previous methods".

"We use them wherever possible because of their strength and sealing qualities".

"Every fastener is automatically 'torqued' identically".

"They don't slip, strip or wear loose".

Thousands of smart manufacturers have discovered that HUCK fasteners are truly the BETTER way to do their fastening job.

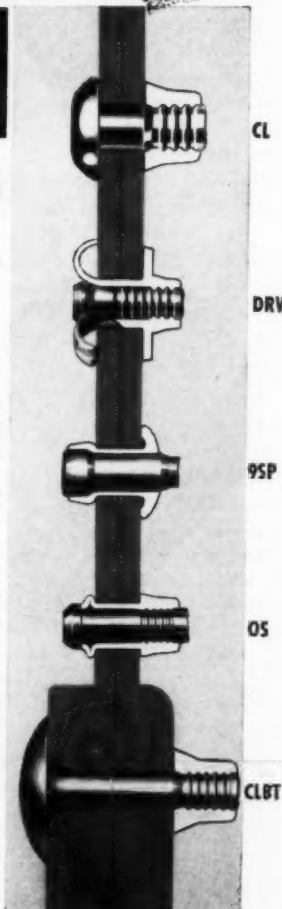
So mechanically predetermined is the result of the HUCK fastening system that unskilled operators can produce professional grade work almost immediately, at up to thirty fasteners per minute. Materials, sizes and head styles to meet your specific requirements.

Give us your fastening problems, our years of experience are at your service.

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by Darrell Ward, Engineering Editor



HOW CLARY BUILDS



The main side frame sub-assemblies, which contain most of the control linkage, appear to be a rather simple operation. But these units are almost identical for all models of Clary adding machines and cash registers. Simplified breakdown of operations reduces skill required for job.

Spring clip retainers and taper pins are the fasteners used at this first final assembly position where side frames and lateral member are brought together with cam follower shaft. This basic framework is the supporting cage for all other sub-assemblies.



Divisional integration of sub-assemblies serves three purposes—easier installation, immediate inspection and adjustment, and a smooth flow of assembly line work

RELIABILITY AT LOW COST

How would you approach the problem of making a highly reliable piece of equipment to sell in a highly competitive market? Normally, these two requirements are diametrically opposed to one another at the engineering and production levels, but frequently sought goals by management. All too frequently, reliability has to be neglected to some extent before cost can be held down within reason. Or, if reliability is prerequisite, the selling price must be jacked up to provide for a different approach on the assembly.

The Clary Corporation, in their new plant at Searcy, Arkansas, has licked this dilemma in some interesting ways. Their approach to the problem and methods evolved for its solution represents some of the finest engineering thinking we've found. The straightforward logic tends to make their approach appear so obvious and simple that one is

inclined to ask, "Why hasn't every manufacturer made the same approach?"

RELIABILITY—AN ENGINEERING NECESSITY

Reliability was a practical engineering necessity, not a nebulous sales pitch when Clary engineers went to work on the new Model 169 adding machine. They could not afford to put out a complex mechanism at a bargain price and have to worry about service calls or undue repairs. It had to stay sold under normal service conditions. If service was required, it had to be kept simple and economical for field service, instead of being so complex as to require factory service.

On the other hand, many assembly problems had to be eliminated or simplified to hold the cost down to a minimum.

The solution to this dilemma came first in a

continued



The main cam line and accumulator sub-assembly are installed with ten round head screws in two sizes. Sub-assembly feeder line, at right angles to final assembly, is lost in the distance of the background.



Rack drive shafts and main racks go into final assembly with only spring clip retainers. Control linkage is also connected with spring clip retainers, and keyboard is assembled with four Sems.



Left: Use of flat head screws, to utilize self-aligning tapered shoulders, locks printer sub-assembly in place. Two additional spring clip retainers are applied to floating linkage at this point.



Right: A taper pin is driven up tight to hold motor sub-assembly to side frames. Motor base rail is a lateral structural member of machine. Taper pins also provide for quick access if servicing is required.

Ribbon and roll paper are installed, and preliminary adjustments are made here on eccentric in rack-drive linkage, printer dial, motor gear mesh, and governor speed. Heavy wear parts, such as gears, are lubricated with

moly sulfide paste. The worker makes the machine operate, but not necessarily function properly. The latter is accomplished on the final inspection and testing line. Belt conveyor at left moves units down final assembly line



ample, are interchangeable stock items for 21 machines. In addition to this, about 75% of all parts are interchangeable in 13 adding machines and 6 cash registers. As far as we have been able to determine, this extent of standardization in the business machine industry is rather fantastic. Perhaps, this would explain why Clary has been credited with helping to pioneer the low cost reliable machine.

SUB-ASSEMBLIES ARE FUNCTIONAL UNITS

Actual assembly simplification, and preventive measures against potential trouble, extends just as far along the same line of reasoning. Each of the major sub-assemblies, broken down into functional units, is an integral assembly in itself. Each can be put together, adjusted or regulated, and made to perform its function separately from anything else in the machine.

This divisional integration of sub-assemblies serves three assembly line purposes. One is that sub-assembly parts are easier to install because a worker

does not have to reach into inaccessible places, therefore the parts move faster along the line.

A second is that if a sub-assembly is taken as an independent functioning unit, and made to function properly before it goes into final assembly, many inspections and adjustments are moved away from the end of the line and back to points where they rightly belong.

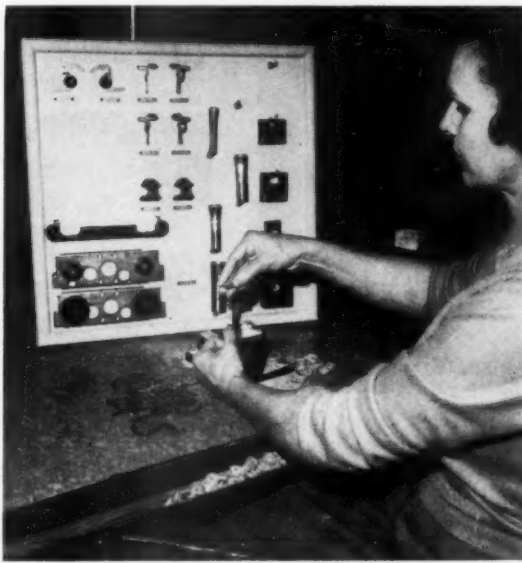
A third purpose of the system is that each of the sub-assembly lines can be individually spread out or reduced to employ any desired number of people to smooth out the flow, or cushion any fluctuations in personnel that may occur. Units then are fed to the final assembly line from right angles at points where sub-assemblies go into the frame.

Pass-through shelves between work positions help cushion against individual bottle-necks and also eliminate the need for mechanized conveying. Each worker takes a sub-assembly from the storage shelf on one side, performs his work, then passes the part to the shelf between him and the next

continued

Left: Fastening and clamping tie-bars on side frame with printer tie-rod in place is a simple operation with two flat head screws and screwdriver.

Right: An interesting collet and jig method is used in assembly of rubber grommets. Panel display shows matching parts. Jig works by air pressure and foot pedal control to make collet squeeze grommet on all sides as it pulls down through hole, automatically releasing grommet to expand in proper position.



This department hums like a beehive as machines are adjusted and inspected. Adjustments are made according to engineering specifications. Operators work machines according to tests which break in the work-

ing mechanism and also search out possible errors. Trained correctors make their adjustments. And a more skilled inspector checks and makes final corrections if necessary.



position. At the end of the sub-assembly line, there are stock storage bins from which final assembly workers select their units to go into the machines.

FEWER DETAILS CUT CHANCES FOR ERRORS

The whole system of breaking down, integrating, cushioning, and general simplification of specific tasks enables the company to utilize less highly trained workers. Fewer details have to be remembered by any one individual so each is less likely to make mistakes. If more people are required to increase production, various details are spread out further and new people have even less to remember, or simply less training to make them capable of meeting production requirements.

Making integrated sub-assemblies which function independently also simplifies the amount of skill required of an adjuster and an inspector. It has

proven to be a great expedient, not only in eliminating more tedious problems at the end of the line, but in getting more, properly functioning units up to that point. If something is not exactly right when it is tested, it is immediately corrected on the sub-assembly line instead of being left to show up after it is almost covered by other parts in the completed machine.

Integration thus becomes an engineering and management attitude, from original design right down to the last function on the assembly and inspection lines. Without this quality of thinking and overall planning, in which even the screws, nuts, taper pins and bearings are functional elements of the whole plant operation, it is conceivable that the model 169 Clary adding machine might conceivably sell for \$200 or more instead of the \$169 price tag it was designed to fit. •

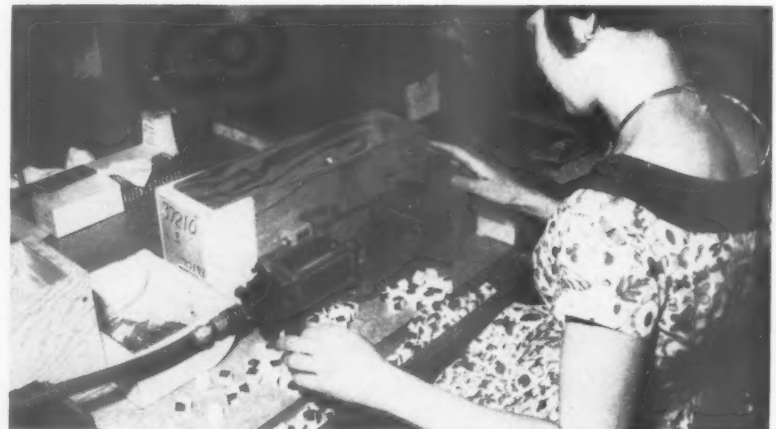
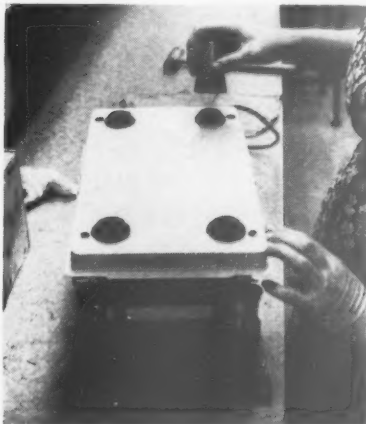


Worker adjusts case mounting grommets to make balanced 4-point support for molded plastic case. Molded legs are self-centering in grommets.



In sub-assembly of keyboard, a simple pan fixture holds the keyboard by natural spring action of pan sides.

Collets grip rubber-grommet feet on bottom of machine frame. Steel pan is merely pressed down with collets passing up through grommet holes. When bottom pan is seated, collet jaws spring outward and permit grommets to expand into place. Grommet design places rubber under shear stress to eliminate transmission of vibration from machine to desk.

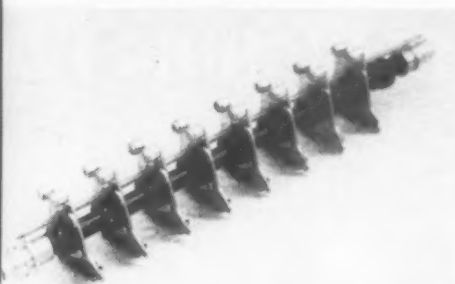


Sub-assembly of keys is so rapid that the eye can hardly follow the operator's hands as she feeds key caps with left hand into chuck at right, and stems with her right hand into chuck at left. Cross-hand feeding develops a rythmical motion which seems to develop effortless speed. A two-valve safety provision prevents closing air-ram unless both hands are safely away.



Accumulators are dismantled from fixture after stacking when inspection is made in this fixture. Sub-assembly is

held by end-plates exactly as it would be in a completed machine. Binding or faulty parts can be detected here.



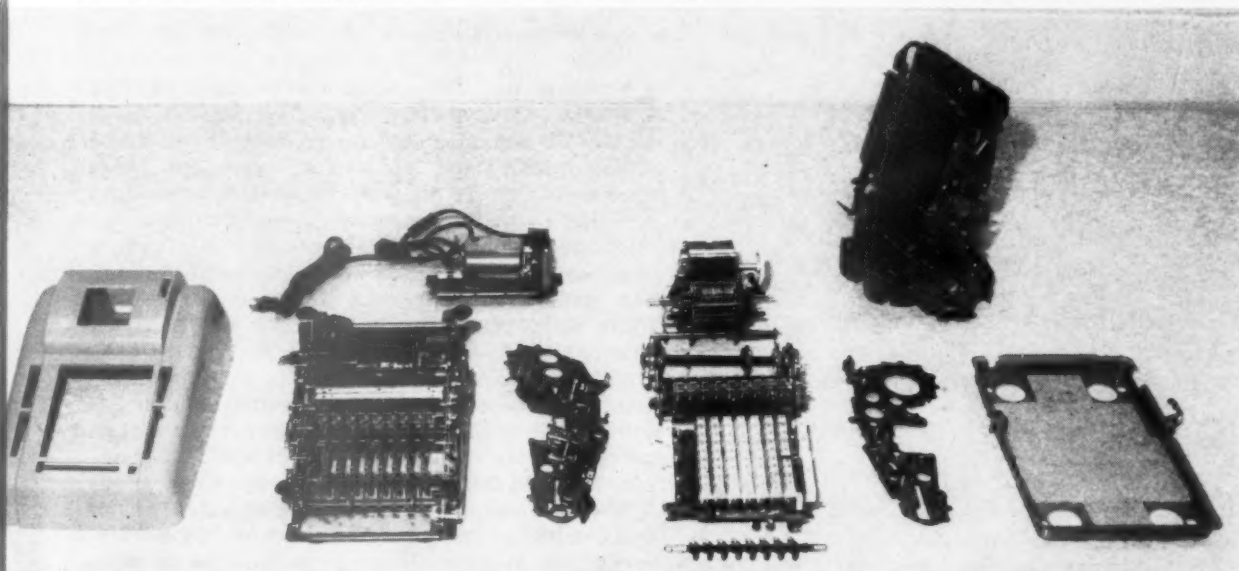
Left: Rack drive unit is different from other designs since spring-loaded rollers ride friction-free on racks, once actuated. As spring tension tends to make segments fly apart, this is avoided by using a single wire retainer, run through holes in segments, until unit is installed during final assembly.

Right: Rack drive shaft sub-assembly is held in rotating fixture with "broom" clips. Fixture supports assemblies at both ends while 5 parts are installed at one end and 4 on other end.



This display of sub-assemblies and case parts demonstrates breakdown of integrated functional units produced on sub-assembly lines for simplified final assembly of machine. From left to right in center row are cover, basic machine (bottom view) with rack, motor, and most of control linkage, left main side frame with

linkage, keyboard sub-assembly, right main side frame with linkage, and base pan. Motor unit is seen above basic machine. Below keyboard assembly is rack drive shaft. Above, reading up, are main cam shaft and printer. At upper right is structural framework cage with components removed to show basic structure of machine.





UNUSUAL FASTENING

Use of brass tapped-rivets in this hot-dipped galvanized assembly avoids the possibility of bi-metal corrosion.



*Permanent magnets,
stainless steel staples,
and tapped rivets are used
in assembly operations
at Drayer-Hanson*

Here at the Drayer-Hanson Division of National-U.S. Radiator Corp., Los Angeles, California, we manufacture a comprehensive line of air conditioning and refrigeration equipment. Units produced range all the way from small, home-type installations to huge commercial and industrial installations. Many of these products are standard stock items and are in continuous production; others are custom-built, on order only, and designed to fulfill a specific customer's special requirements. The only parts of these products we do not produce ourselves are the actual chiller and compressor components used in the refrigeration cycles. All primary air moving and handling components, such as coils, filter sections, zoning dampers, ducting, etc., are produced and assembled in our own plant.

We have some unusual fastening problems on these units, primarily because the fastening requirements are in themselves unusual. To begin with,

by **Fred Savaglio**
Plant Manager
Drayer-Hanson Division
National-U.S. Radiator Corp.



Aluminum tapped-rivets are used here on air cooler. Their use simplifies subsequent mounting of cover plates.

TECHNIQUES FOR AIR CONDITIONERS

many of the sheet metal panels on an air conditioning or refrigeration unit must be installed so that they are easily removable for interior cleaning and servicing. This makes the use of mechanical fasteners almost mandatory. Secondly, and especially on the commercial and industrial units, the fastener must be highly corrosion resistant. Such units encounter many and varied corrosive mediums during their normal service life. If the fastener corrodes, subsequent removal of the panels for interior cleaning and servicing will become difficult if not impossible. Also, these same corrosive mediums may set up bi-metal corrosion between the fastener and the part on which it is installed unless compatible materials are used. Such corrosion will eventually weaken both the fastener and the component on which it is mounted.

Along with these two major problems—providing interior accessibility and preventing corrosion—there are the ever-present problems of using a fastener that is economically feasible and that expedites production assembly operations. How we at Drayer-Hanson have solved these fastener problems, in the interest of both product quality and production costs, may prove interesting to others faced with similar fastener problems.

Many of the problems in conjunction with easy panel removability are solved by the use of tapped rivets. These fasteners are essentially hollow rivets

continued



Joining the coil pan to an air cooling component with stainless steel staples avoids corrosion possibilities.

Assembly Operations at Drayer-Hanson, continued

with the bore tapped to accept a standard bolt or screw thread. The rivet portion of these fasteners is permanently installed with a special rivet gun through the various structural members that come together around an opening that will ultimately be covered by a removable panel. The tapped bore of the rivet is so placed that it will receive a bolt which is used to hold the removable panel in place. Mounting this removable panel during initial assembly of the unit, and removing it and replacing it during servicing at a later date, is thus reduced to the simple procedure of screwing a few stud bolts into the tapped rivet bores.

Most of the tapped rivets employed are of anodized aluminum material. The anodic coating, plus the inert qualities of the metal itself, make them highly resistant to most corrosive influences. One exception is the use of a brass tapped rivet in our Permanfan evaporative condenser assembly. This unit is entirely hot dip galvanized, and the brass

tapped rivet is compatible with the hot dip galvanized coating so that no bi-metal corrosion occurs.

If a tapped rivet was not used for this purpose, a conventional bolt would have to be inserted through the removable panel, then through the holes drilled in the various structural members that came together around the opening for the removable panel. A nut and lock washer would have to be used to hold the bolt firmly in place. This would make panel removal a difficult job, and would slow initial assembly operations.

The stainless steel wire staple installed by a conventional metal stitching machine is another type of fastener used extensively in the assembly of Drayer-Hanson products. Though these machines were initially purchased for stapling felt and weather stripping in place, it was soon discovered that they were useful in more conventional assembly operations.

One such operation involves the assembly of

continued



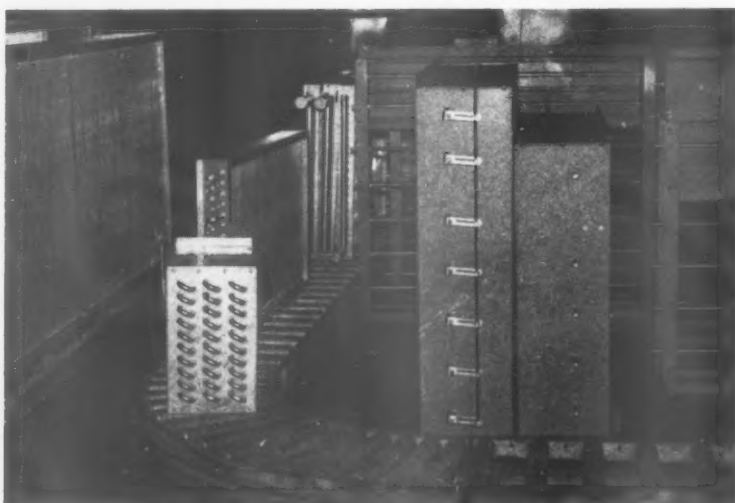
A bridge crane adjacent to the assembly line swings assemblies into and out of a cleaning tank.



Fred Savaglio, author, inspects new type fulcrum clamp strips on a new unit undergoing tests.



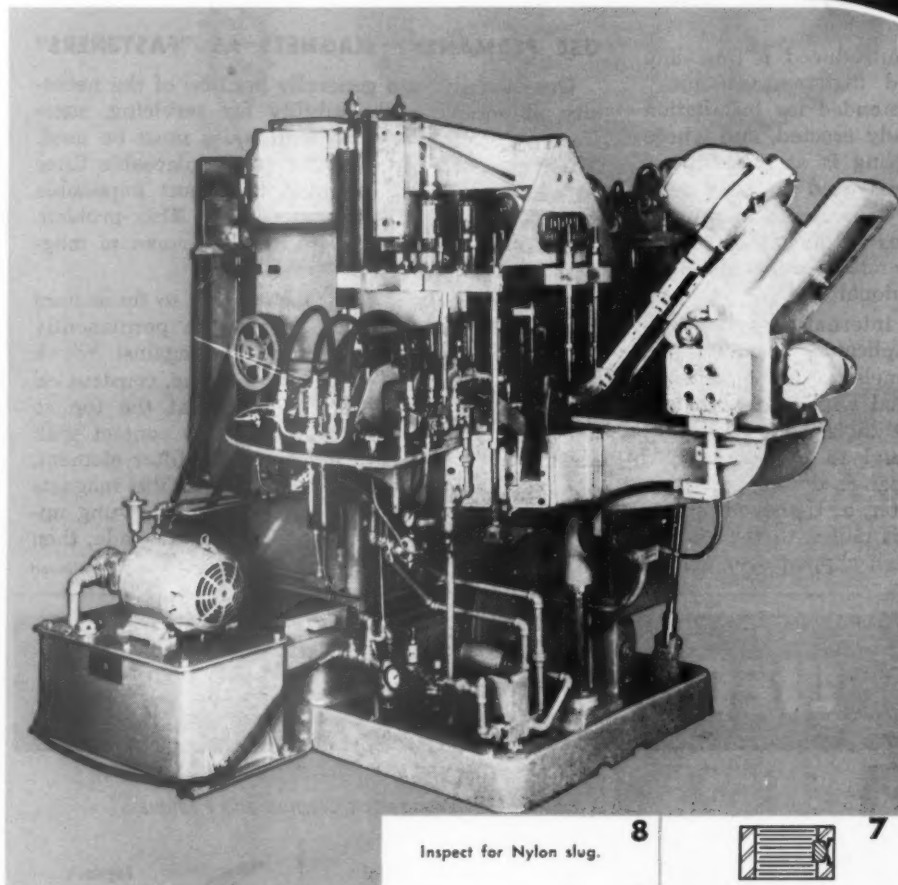
Products undergo tests in booth without being removed from the assembly line conveyor.



Roller conveyors provide many conveniences in the assembly of air conditioning and refrigeration equipment at Drayer-Hanson, such as conveying partial assemblies to and from paint booths prior to final assembly.

Bodine CASE HISTORY NO. 26

(AUTOMATIC DRILLING, TAPPING, ASSEMBLY
AND ELECTRICAL INSPECTION OF A
SPECIAL NUT)



1

Automatically hopper feed
Hex Nut Blanks to dial.
2 pieces per stroke.



2

Horizontally drill hole to
half depth.



3

Horizontally drill hole
thru.

4

Electrically inspect for
drilled hole.



5

Tap thread thru nut.



6

Shear off Nylon slug and
automatically insert in
drilled hole.



7

Hydraulically stake Nylon
slug to proper depth.

Inspect for Nylon slug.

8

Automatically eject fin-
ished nuts.

9

PRODUCTION

Battery of machines tooled for all sizes of nuts to and including $\frac{1}{2}$ " dia. Various materials. Production on $\frac{3}{8}$ " — 24 standard steel nut is 44 pieces (or 396 operations) per minute.

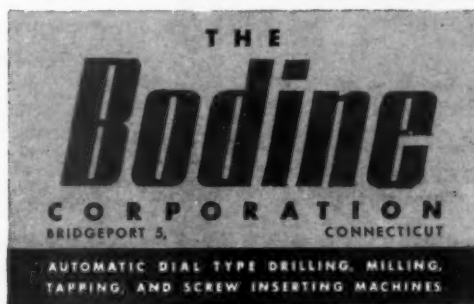
One operator handles a battery of machines.

Bodine machines can jump your competitive position to the top. Make our engineers prove it. Write for Bulletin. Dept. AF.

"You can't meet

Tomorrow's Competition

with Yesterday's Machine Tools"



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Drayer-Hanson Assembly Operations, continued

coils with their aluminum tube sheets and side pans or coil baffles. Wire stapling these components together has proved both rapid and efficient. The stainless staples employed are highly resistant to corrosion. When the two legs are driven through the metal then folded together during the stapling operation, they provide what might be termed a "doubly secured joint."

Drayer-Hanson recently introduced a new line of air handling products called "high pressure units." These units are primarily intended for installation in buildings which are already erected, and where space requirements for ducting is at a premium. Because of the high pressures used in these units (approximately $7\frac{1}{2}$ inches of water, with an air flow of 116 miles per hour as it leaves the plenum or mixing box), the air handling ducts need be only $\frac{1}{4}$ to $\frac{1}{3}$ the conventional size.

Quite normally, the high internal pressures employed in these units complicated assembly and fastening. The removable panels are made of heavy gauge sheet metal re-inforced with stiffeners, and in turn are bolted to heavy angle iron frames. To simplify initial assembly, and to make it easier to remove and replace the panels during servicing, steel cage nuts mounted on a U-shaped spring steel clip are employed. This clip with the $\frac{3}{8}$ -inch bolt on the nether leg is then slipped over a half-

inch hole punched in the angle iron frame. A $\frac{3}{8}$ -inch bolt is then slipped through a half-inch hole in the cover plate, through the half-inch hole in the angle iron frame, and screwed into the self-centering cage nut. The looseness of the nut in its cage on the clip permits it to center on, but not move away from, the bolt during assembly. The oversize bolt holes make for easier assembly and eliminate the necessity of precise hole matching.

USE PERMANENT MAGNETS AS "FASTENERS"

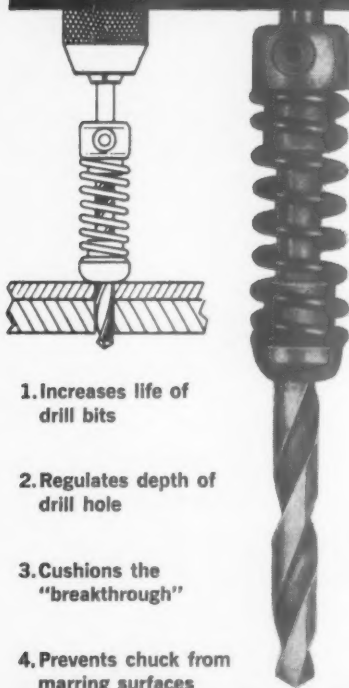
Occasionally, and generally because of the necessity of complete accessibility for servicing, some unconventional fastening techniques must be used. This happened when mounting a replaceable filter in one unit where it would be almost impossible to reach it with any type of tool. This problem was finally solved by using small permanent magnets to hold the filter in place.

The small Alnico magnets (similar to those used to hold cupboard doors closed) are permanently installed in the structural frame against which the filter frame closes. The filter frame, constructed of a magnetic material, is hinged at the top so that it will fold downward and into contact with the magnets. When installing a new filter element, the attraction of the filter frame to the magnets is broken by a sharp tug, the frame is swung upward, the filter element replacement is made, then

continued

Stop Breaking
Drill Bits!

WEDGELOCK DRILL STOP



The Wedgelock Drill Stop consists of two steel end pieces connected by a coil spring. Slips over standard size drills from #50 to 5/16" dia., and is adjusted for required depth simply by tightening set screw. Special sizes available on request.

Wedgelock Clamps and Fasteners



Sheet Metal Clamps
Sets and releases with one hand in one operation. Many styles.



Edgelock Fasteners
Spring actuated. Powerful. Applied with pneumatic or hand pliers.



Speed Bolt Fasteners
Wide variety of holding pins to fit one standard body. Holds up to 250 lbs.



Wing Nut Fasteners
Handles thicknesses up to 2 1/4". Adjustable pressure. Many sizes.

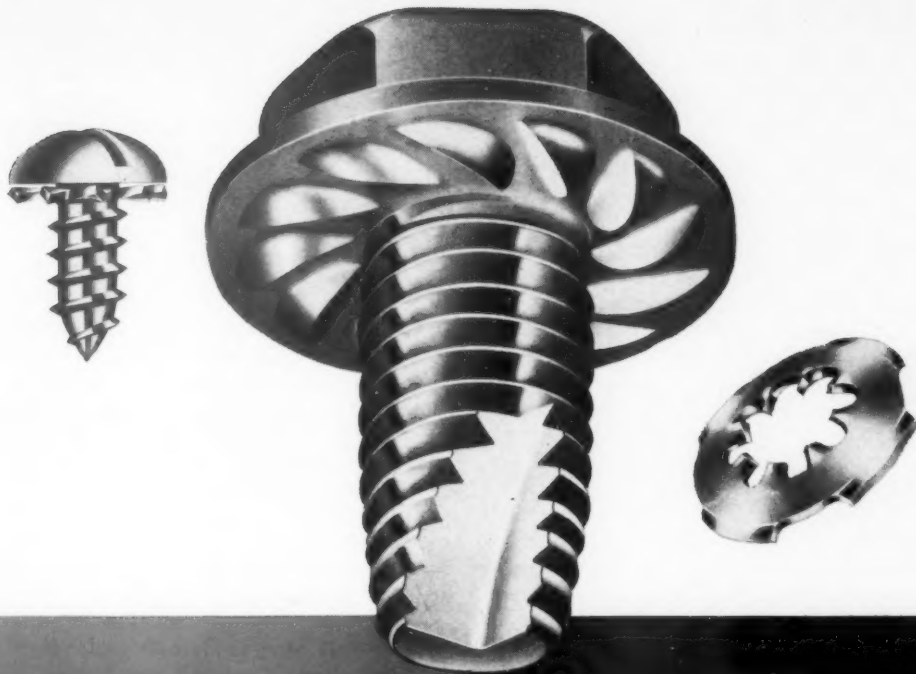


Spring-Actuated Fasteners
Fast alignment of rivet and bolt for lighter materials. Applied with pliers.

Wedgelock makes the greatest variety of fast-action clamps and fasteners in the country. For information on these and other Wedgelock products write—

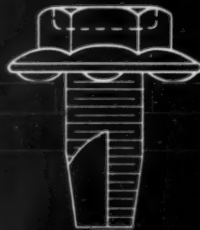
WEDGELOCK
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HOW TO SELECT COST-SAVING

fasteners for sheet metal



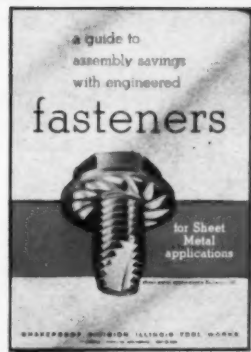
A TYPICAL EXAMPLE: How to Avoid Stripping—

When high stripping torques are required, a Shakeproof NIBSCREW® should be used. "Nibs" under the head take up excessive driver torques and eliminate loose screws, re-work and repair.

You can realize important savings on your assembly line by specifying fasteners that eliminate operations, speed up production and assure highest quality. Engineered Fasteners by Shakeproof now overcome stripping, provide sealing, assure maximum locking and solve countless production problems encountered in mass assembly of products using sheet metal.

SEND FOR NEW SHAKEPROOF BULLETIN NO. 1001

Illustrates twelve typical examples of cost saving fasteners for sheet metal applications. Describes important "check points" for fastener selection. Offers testing samples. Write for your copy today!



SHAKEPROOF

"FASTENING HEADQUARTERS"®

DIVISION OF ILLINOIS TOOL WORKS

St. Charles Road, Elgin, Illinois
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Division of Canada Illinois Tools Limited, 67 Scarsdale Road, Don Mills, Ontario
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Drayer-Hanson Assembly Operations, continued

the frame is swung downward again against the magnets. This unconventional fastening technique has long since proved successful under all service operating conditions.

Drayer-Hanson is now developing a new fastening technique which deserves mention at this time. It will be employed to hold removable panels on some of our larger air handling units. Now the panels are held in place by self-tapping screws inserted through holes drilled in an angle iron trim strip, through the removable panel, and into the various structural members that come together on the cover plate frame.

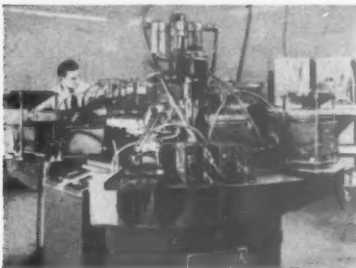
In the new fastening technique, the cover plate will merely lay upon the angle irons of the frame. A fulcrum clamp strip $1\frac{1}{4}$ inches wide will then be bolted directly to the angle iron frame. One side of this fulcrum clamp strip will extend over the edge of the cover plate to hold it in place; the other side of the clamp strip will brace itself against the frame. Holes will be pre-pierced in the angle iron frame sections by a pair of fully automatic, electronically indexed punch presses now being prepared for the work. The same presses will be used to pierce the clamp strips so that the indexed holes will match. The same presses (and in the same operation) will impart an arch shape to the fulcrum clamp strip from which it will derive its hold-down leverage.

The above described specialized fastening techniques does not imply that conventional fastening and joining methods are not used along the Drayer-Hanson assembly lines. We have three 75 kva spot welders in use, one of them stationary, the other two portable. All are of the deep throat variety for spot welding in "hard to reach" places. Spot weld joining is used quite extensively on smaller units and in places where the spot will not be visible after installation.

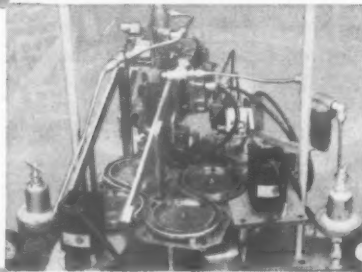
BRAZING AND WELDING APPLICATIONS

Brazing and welding are also employed. Most of the steel frame structures are joined by fusion welding. They are first tack welded in a three dimensional tooling jig, then removed and finish-welded on a flat steel plate which is equipped with the necessary projections to assure frame squareness. Silver brazing is used on many coil components where pressure retention is necessary. Roll seam welding is often used for joining thin fins to the exterior of tubing for typical heat exchanger assemblies.

The numerous different air handling products produced at Drayer-Hanson make it unfeasible to rely too strongly on any one method of fastening or joining. Each product has its own requirements. Sound judgment based on years of design and servicing experience must be brought to bear on each problem as it accrues and made to reflect in ultimate product quality. •



**MULTI-STATION
ASSEMBLY MACHINES**
with interchangeable
assembly tools.



SINGLE STATIONS
for established
production lines.



FEEDERS
custom designed
for any operation.

WHAT'S YOUR ASSEMBLY PROBLEM?

Multra engineers are prepared to assist you in assembling *your* product automatically. Their wide experience in parts handling and assembly problems will quickly enable them to evaluate your product and advise how it may best be handled.

Multra engineers are qualified to take over completely the design and assembly problems related to automatic assembly of a product and to deliver a machine ready to operate in full production. This may be a complex multi-station assembly machine — it may be a relatively simple 3, 4, or 6-station unit, depending on the particular product — or just an individual tool or feeder for an existing line.

You may prefer to do your own tooling design. In that case, a basic Multra indexing machine, without tools, may be purchased.

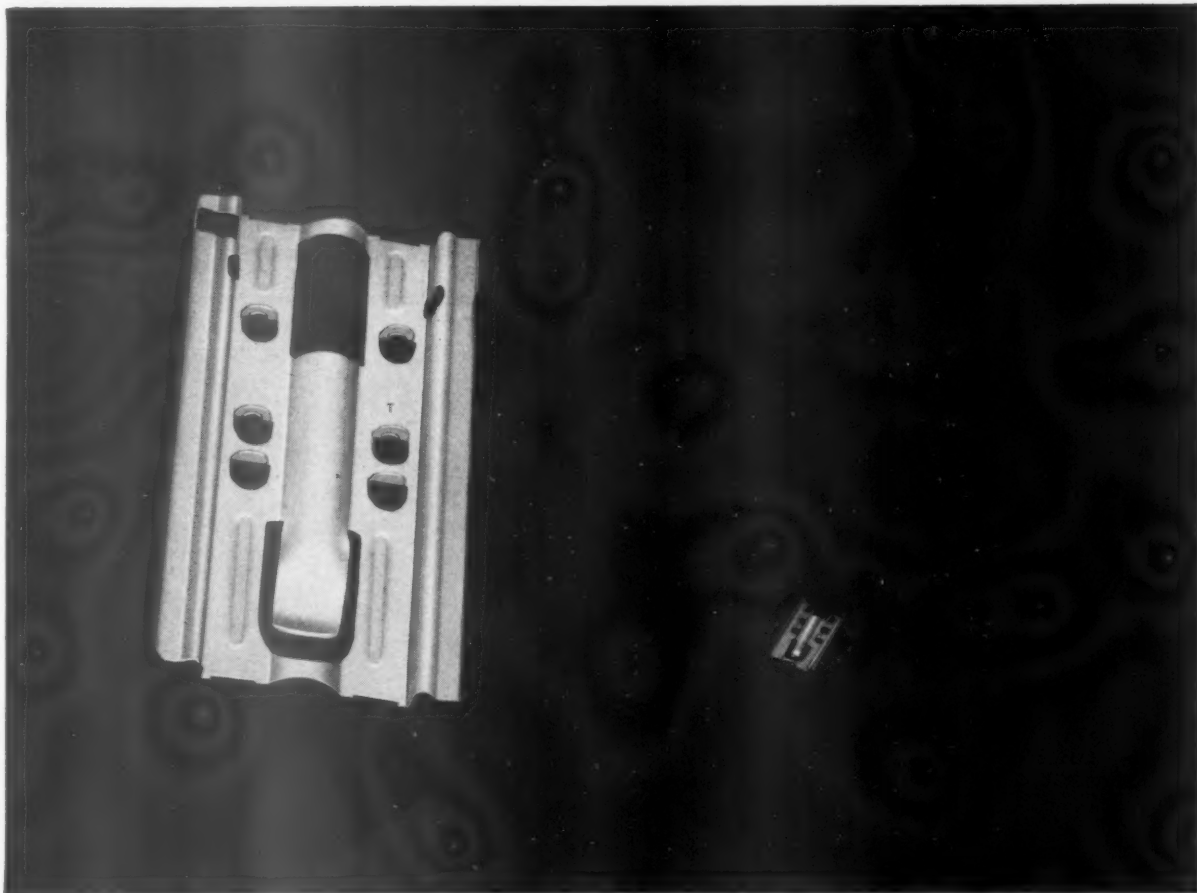
Sperry Multra engineers are available for consultation — no charge of course. Write for technical brochure.

AUTOMATIC ASSEMBLY . . .
the key to efficient production.

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MULTRA
AUTOMATIC ASSEMBLY

SPERRY PRODUCTS, INC. • 1904 Shelter Rock Rd., Danbury, Conn.

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Engineered by Tinnerman...

Easier to assemble...easier to operate... **SPEED CLIP®** costs 50% less, too!

Assembly of the **SUPER-FILER® Divide-a-File** mechanism was considerably simplified when the General Fireproofing Company switched to a special **SPEED CLIP** design. Sightless people do the assembling without former difficulties of fitting spring wires into non-uniform stampings.

With this **SPEED CLIP**, the "self-adjusting" *Divide-a-File* slides more smoothly back and forth in the channel. Locking in the desired position is more positive, too.

This is another example of how Tinnerman Engineering goes far beyond the original fastening idea—how we work with customer engineering departments to produce better working units. And in the above case, a per-part cost reduction of 50% was achieved. In only 4 months, General Fireproofing had saved enough through lower assembly and parts costs to write-off new tooling needed to produce the **SPEED CLIP**.

You, too, can achieve savings and improvements like these on your assemblies. Invite your local

Tinnerman sales representative in for a discussion of the **SPEED NUT** methods of better fastening at lower cost. He's listed in most Yellow Pages, under "Fasteners". Or write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN *Speed Nuts®*



FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A. 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.
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Engineering problem:

Pressure-tight fastening of transit cases

The solution:

A specially modified **LINK-LOCK**

Applied Design Company

engineers worked with

Simmons to develop this successful

LINK-LOCK application

Simmons LINK-LOCK, with design modifications developed in cooperation with the Engineering Department of Applied Design Company, Buffalo, New York, resolves special closure requirements in rigidly specified transit cases like the aluminum equipment container shown.

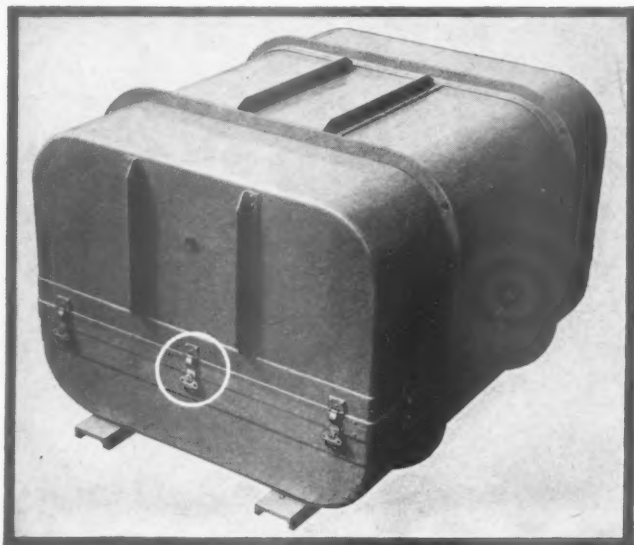
Here, the bowed LINK-LOCK engagement blade provides the double advantage of maintaining constant fastener pressure and permitting considerable mounting tolerance. This container is just one of many important products in which Applied Design specifies standard and special Simmons Fasteners.

Here's why LINK-LOCK is ideal for use on military cases produced to exacting specifications as well as on inexpensive commercial containers:

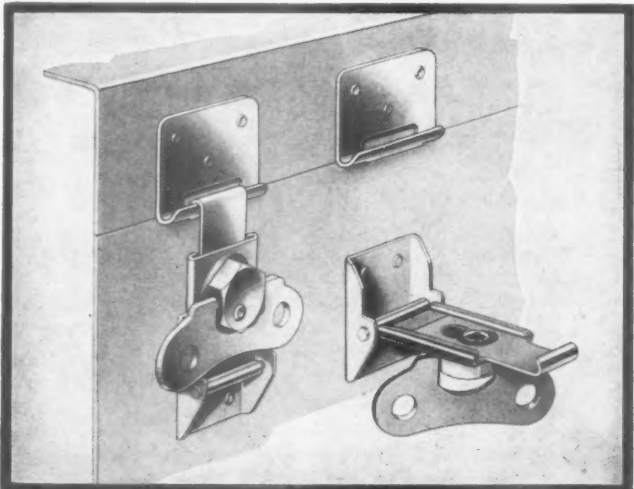
- Impact and shock resistant (positive-locking).
- High closing pressure with light operating torque...insures pressure-tight seals where required.
- Available in 3 sizes, for heavy, medium, and light duty.
- Compact design...lies flat against case even when unlocked.
- Opening and closing by wing-nut, screwhead, or hex nut.
- Flexible engagement latch design...can be varied to suit different conditions.

Also available: Spring-Loaded LINK-LOCK. Ideal for the less expensive containers where costs won't permit precision production. Spring provides take-up to compensate for set in gasketing, irregularities of sealing surfaces, and mounting inaccuracies.

SEND TODAY for the Simmons Catalog for complete information and engineering data on LINK-LOCK and other Simmons Industrial Fasteners. Engineering service is available; outline your particular fastening problems. Samples on request.



Twelve special loop-blade LINK-LOCK fasteners are used in this aluminum transit case designed by Applied Design Company.



Standard No. 2 LINK-LOCK (Medium-Duty). Available with screw-head, wing-nut as shown, or hex nut.

SIMMONS

FASTENER CORPORATION

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QUICK-LOCK • SPRING-LOCK • ROTO-LOCK • LINK-LOCK • DUAL-LOCK • HINGE-LOCK

See our 8 page catalog in Sweet's Product Design File

Use postpaid card. Circle No. 222

by **Kenneth E. Anderson**
Vice Pres. & General Manager
Norge Division, Borg-Warner Corp.
Muskegon Heights, Michigan

ROTARY AIR TOOLS PREPARE TUBING FOR BRAZING



Refrigerator compressor on conveyor line nears the station where tubular connections are to be cleaned with hand-held rotary air tool prior to brazing.



At this station, flux is applied to tubing, followed by brazing, with hand torch supplying heat.

FOR BRAZING

*Two simple rotary devices,
applied to a hand-held air tool
do the trick—a conventional fluted
reamer and a wire brush*

The brazing of tubing connections on household refrigerators is one of the principal applications in which silver alloys are employed. Tightness of such joints is essential, hence the most precise and careful checking for even the smallest leaks is required. If leaks are detected, they must be stopped.

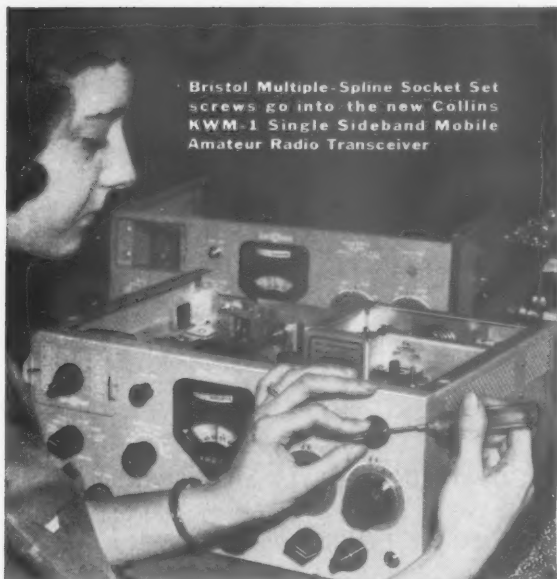
This not only involves time and expense for re-brazing, but in the whole series of rechecks without which the success of reworking would remain unknown. The cost of such tests, plus any work needed for extra dehydration, adds to the expense. Accordingly, the makers of refrigerators always are seeking the causes of leaks and minimizing their occurrence.

CHEMICAL CLEANLINESS A NECESSITY

It long has been known that the chemical cleanliness of metal surfaces to be brazed is essential to the production of dependable and tight brazed joints. Such cleanliness, however, demands good cleaning practices and the avoidance of laxity. Unfortunately, human problems are involved. A reliable flux is a major factor in promoting cleanliness, but it cannot always do the whole job. Proper application under controlled conditions is required. Even then the flux may not always reach all critical surfaces. If this happens, the chances of attaining the desired results are reduced.

Not long ago at our plant, leak tests revealed more faulty joints than could be tolerated. Rework costs were considered excessive. One of the best fluxes was used and is still being used. It was concluded that perhaps better initial and purely mechanical

continued



Bristol Multiple-Spline Socket Set screws go into the new Collins KWM-1 Single Sideband Mobile Amateur Radio Transceiver

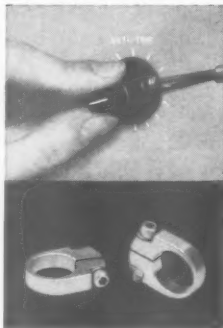
Design report from Collins Radio Co., highly respected manufacturer of electronic gear:

"We use Bristol Socket Screws in much of the communication/navigation equipment we design and manufacture."

Here's one more leading manufacturer who designs with Bristol's exclusive Multiple-Spline Socket screws for critical fastening operations. Reason #1: Multiple-spline screws give extra holding power... especially under shock and vibration. Reason #2: They cost no more than standard hex socket screws. Check your industrial distributor on the applicability of Bristol Socket Screws to your fastening problem.

Cap Screws, too

Bristol Multiple-Spline Cap Screws give extra holding power to this aluminum O-clamp used in assembly of variable capacitor. Have you an application where the advantages of cap screw design could help? A-8-13



Precision socket screw manufacturers since 1913

Bristol's Hex Socket Screws

Bristol's Multiple-Spline Socket Screws

*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1 1/2" diam.

THE BRISTOL COMPANY Socket Screw Division
Waterbury 20, Conn.

Preparing Tubing for Brazing, continued

cleaning might help. This conclusion was soon borne out.

A local firm, Buehrle Engineering Co., assisted by adapting small air-driven tools for cleaning tubing ends. Soon rejects dropped by 70 to 80 percent.

CLEANING DEVICES APPLIED AT SAME TIME

These manually-held Aro tools apply two simple rotary devices simultaneously. They are a conventional pointed and fluted reamer, slightly larger than the tube bore, and an external brush with fine stainless steel wire forming the radial cleaning elements. Their ends lie in the cylindrical surface of a central hole slightly smaller than the tube o.d.

These simple tools remove little metal, but leave clean interior and exterior surfaces, free from oxide and foreign matter. Such surfaces respond well to the action of the flux applied in the brazing that follows immediately. Brazing wire with 35 percent silver content is used.

Surface preparation and brazing are done, on both Bundy and seamless copper tubing, along a conveyor line carrying the refrigerating units.

REVERSE AIR FLOW REMOVES RESIDUE

It is essential that no particles of metal removed by the rotary tools remain in the tubing. So the tubing is connected to a compressed air line. This reverse air flows out of the tube being cleaned and carries with it such chips and fine particles as are removed by the rotary cleaning tools.

The new rotary tools have been found highly effective. Together with extra care exercised, they have brought the proportion of leaks well within the minimum considered commercially attainable. In addition there is a corresponding cut in repair costs which is most gratifying.



Here is the air tool with reamer and rotary brush currently being used in Norge refrigerator plant to clean bore and outer surface at the ends of tubing to be silver brazed. This operation substantially reduced the number of "leakers" needing reworking.

IT PAYS TO STANDARDIZE ON STANSCREW



Machine Bolts and Carriage Bolts Now Produced to Stanscrew Quality Standards

Stanscrew presents a new line . . . carriage and hex machine bolts . . . now produced and stocked in a complete selection of more than 500 different sizes. Manufactured under careful quality control methods, they meet the same standards of uniformity and dependability which have made other Stanscrew fasteners a leading choice of American industry for over 80 years.

These new additions bring Stanscrew's complete line to over 5,000 different types and sizes of standard, catalogued fasteners. From this comprehensive selection you can find dependable, economical answers to the overwhelming majority of all your fastener needs.

Your Stanscrew fastener specialist, available

through your nearby Stanscrew distributor, can show you many ways these inexpensive standard items will cut your product costs . . . for example, by replacing costly special fasteners.

Each of the over 5,000 different Stanscrew fasteners is always kept in stock at three conveniently located plants. This enables your Stanscrew distributor to provide faster service . . . to be particularly helpful in emergency situations where prompt delivery can mean substantial savings.

So, whatever your fastener requirements, just call your nearby Stanscrew distributor. Or for complete information on Stanscrew's new carriage and machine bolts, simply mail the coupon below.



STANDARD SCREW COMPANY

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Please forward complete information on

☐ Machine bolts ☐ Carriage bolts

Name _____ Title _____

Company _____

Address _____

City _____ State _____

Hot or cold, it still holds insulation tight ... 3M Adhesive EC-1128



UNDER THIS METAL PANEL, EC-1128 FASTENS INSULATION FIRMLY. NEITHER ICY COLD NOR BOILING WATER HURTS THIS RUGGED BOND.

Torture this 3M adhesive yourself! Prove that EC-1128 goes on holding insulation tightly ... whether sheet metal is -20°F. cold or $+300^{\circ}\text{F.}$ hot. Even these extreme temperatures don't make EC-1128 brittle or soft. The result: You know you're bonding fibrous glass to duct work firmly and to stay, when you use EC-1128.

And EC-1128 bonds foil to foil, too. You can lap the foil facings on insulation sections, seal the lap joints positively with EC-1128. It shuts out moisture, heat and steam, keeps insulation dry and fully effective.

What's more, EC-1128 takes both the wait and hurry out of duct insulating. Brush or spray it on. You can apply

insulation immediately, or up to 40 minutes later. Either way, EC-1128 assures you of top insulating efficiency.

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MINNESOTA MINING AND MANUFACTURING COMPANY

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*SKF drives set screws
into ball bearing collars at rates
up to 1200 insertions an hour*

FAST BEARING COLLAR ASSEMBLY



Operator feeds bearing collars against holding lugs which correctly position them for set screw insertion, while machine cycles automatically.



Vibration hopper is loaded with $\frac{1}{4}$ inch set screws prior to starting run on batch of 2-inch lock collars.

High-speed attachments for highly mechanized production can also pay dividends when adapted to smaller, more complex batch-assembly operations. That's the experience of SKF Industries, of Philadelphia, a leading bearing manufacturer.

The operation concerned is the insertion of set screws in ball bearing collars. The problems involved in making this operation even semi-automatic were particularly tough ones, explains Robert W. Campbell, SKF factory engineering supervisor.

The shaft locking collars are designed to fit over the inner rings of ball bearing assemblies which are then shipped to SKF's plant in Hornell, N.Y., for incorporation into "unit pillow blocks."

SET SCREWS LOCK RING TO SHAFT

In final assembly at the Hornell plant, the set screws in the collars are used to lock the inner ring directly to the shaft through clearance holes in the inner ring, rather than threading the inner ring itself. The greater screw engagement in the collar insures more positive locking.

The batch-type assembly operations involve any of 11 different set screw size-length combinations, with one of more than 20 different-sized collars. In addition, some collar sizes require two set screws instead of one. All this variety made it appear a difficult job for anything but hand assembly.

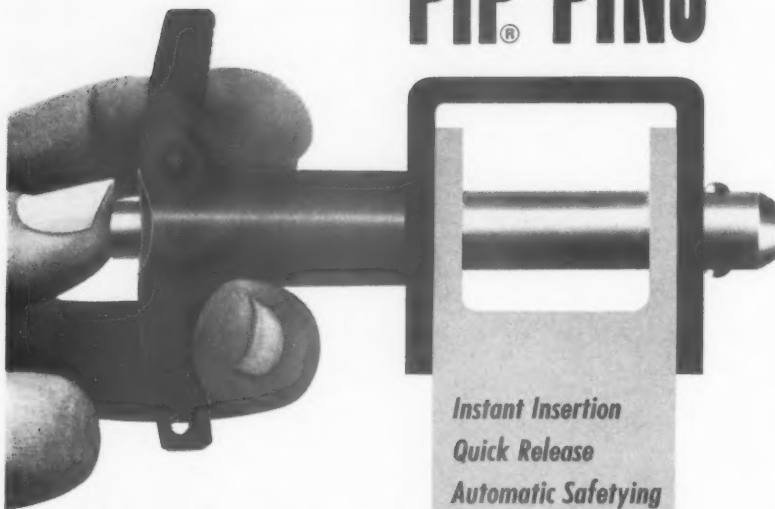
AUTOMATIC SCREWDRIVER SPEEDS WORK

However, the problem of inserting set screws faster has been solved with the aid of a Setomatic screwdriver with a hopper feed. SKF added accessory equipment, including a hopper bin supplying collars, a table loading fixture with movable pegs (to adjust for different sizes and heights of collars), supply trays and delivery chutes.

Operation is simple once the department's setup man has adjusted the machine for the proper diameter and length of screw, and the

continued

5440 SERIES SELF-LOCKING PIP® PINS



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Where design requires a fastener to be self-locking, yet have a quick-release feature... the best is a Pip Pin. Proven in thousands of applications for many years and under every possible operating condition, including severe vibration—Pip Pins offer savings in servicing costs—speed the assembly or disassembly of units—are safe, fast and always dependable. Single-acting PIP PINS cannot be accidentally released, button must be depressed and pin removed. Positive self-locking Pip Pins are industry's most versatile fasteners.

HIGHER PERFORMANCE achieved by improved handle. New handles provide for a better grip and a PIP PIN is the easiest of any pin type fastener to insert and remove. With larger release button, more functional handle... it's the smoothest operating. Hooks furnished with all pins. New T and L type handle styles in diameters to fit nominal holes from 1/4" through 1"... button head type from 3/16" through 1".

Send us your requirements on fastener problems—our Engineering Staff can help you. Write for bulletin #ADI 6500.

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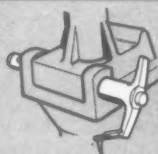
Phone: Victoria 9-4631

210 South Victory Blvd., Burbank, California

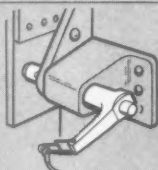
Sales offices in principal cities
Manufacturers of Self-Locking Quick-Release PIP® Pins, Chobert® Rivets and Avdel Sheet Grippers.
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*Instant Insertion
Quick Release
Automatic Safetying*



T handle style for blind or open application



L handle style for blind or open application



Button head type for blind or open application

PIP PINS meet military and commercial specifications.

Bearing Collar Assembly, continued

proper depth insertion for the collars being run. The operator merely puts the set screws in the vibrating hopper, presses a foot pedal, and the screws are fed through a tube to the driving unit by air pressure. The operator hand-feeds the lock collars, placing them against feed-table holding lugs which position them for screw insertion, while the machine cycles automatically.

If a poorly-tapped hole or damaged screw is encountered, the driver will foreshorten its stroke, and a slip-clutch on the driver spindle will prevent damage to either the collar or the machine.











The new assembly method is presently geared for rates up to 1200 set screw insertions per hour. It has helped cut time and costs about two-thirds, saving more than \$4000 annually.











These specific benefits from automatic screwdriving have been realized. A typical 1/4-inch set screw costing 71 cents per 100 insertions by hand methods now costs 23 cents per 100; a 3/8-inch size formerly costing 94 cents per 100 now costs 27 cents per 100.

The quick-changeover machine is currently used for installing screws in four basic diameters, ranging from 10-32 x 3/16 size to 3/8 by 3/4 inches in length. These sizes meet 90 percent of SKF's volume requirements. •



Truarc Retaining Rings, the engineered fastening method for reducing material, machining and assembly costs

function		for axial assembly				for taking up end-play					
nomenclature		basic		inverted		axial assembly		radial assembly			
						bowed		beveled		prong-lock®	bowed e-ring
											
series no.		5000	5100	5008	5108	5001	5101	5002	5102	5139	5131
application		Internal for Housing Bores	External for Shafts	Internal for Housing Bores	External for Shafts	Internal for Housing Bores	External for Shafts	Internal for Housing Bores	External for Shafts	External for Shafts	External for Shafts
range	in.	.250-10.0	.125-10.0	.750-4.0	.500-4.0	.250-1.456	.188-1.438	1.0-10.0	1.0-10.0	.094-.438	.110-1.375
	mm.	6.4-253.8	3.2-253.8	19.0-101.5	12.7-101.5	6.4-37.0	4.8-36.5	25.4-253.8	25.4-253.8	2.4-11.1	2.8-35.0

function		for radial assembly				self-locking types					
nomenclature		crescent®	e-ring	reinforced e-ring	interlocking	circular self-locking			triangular self-locking	triangular nut	grip-ring
											
series no.		5103	5133	5144	5107	5005	5115	5105	5305	5300	5555
application		External for Shafts	External for Shafts	External for Shafts	External for Shafts	Internal for Housing Bores	External for Shafts	External for Shafts	External for Shafts	With Threaded Screw	External for Shafts
range	in.	.125-2.0	.040-1.375	.094-.438	.469-3.375	.312-2.0	.094-1.0	.094-1.0	.062-.437	●	.077-.755
	mm.	3.2-51.0	1.0-35.0	2.4-11.1	11.9-85.7	7.9-50.8	2.4-25.4	2.4-25.4	1.55-11.1	●	●

GENERAL DESIGN PRINCIPLE: Tapered construction permits rings to maintain constant circularity and groove pressure.

Series 5000 and 5100: Basic types for axial installation. Rings provide optimum groove strength.

Series 5008 and 5108: Best clearances. Accommodate parts having large corner radii or chamfers.

Series 5103: Best clearances. Secure against moderate impact, vibration.

Series 5133: Provides high coupling shoulders; accommodates wide groove tolerances. Easy servicing.

Series 5144: Reinforced E-ring. Five times more gripping strength, 50%

higher RPM limits than standard E-rings.

Series 5107: High impact resistance; high coupling shoulders. Accommodates extremely high rotation and relative parts rotation.

Series 5001 and 5101: Resilient end-play take-up. Accommodate wide tolerances. Recommended for pre-loading bearings.

Series 5002 and 5102: Rigidly locked end-play take-up. Recommended for locking one race of parallel bearing assemblies.

Series 5139: Rigidly locked into position by protruding locking tabs. Provides high resilient end-play take-up with sliding tabs for uniform flexure.

Cannot be forced from groove without destroying ring. Accommodates relative parts rotation. Equally effective with round, square, rectangular or hex shafts.

Series 5131: Provides high take-up. Recommended where clearances are a major problem.

Series 5005, 5115, 5105 and 5305: Prongs dig into shaft, locking rings against movement in one direction.

Series 5300: Spring tension locks parts assembled with threaded screws.

Series 5555: Self-locking against movement in either direction by spring tension. Since no groove is required, ring is adjustable to any position on shaft.

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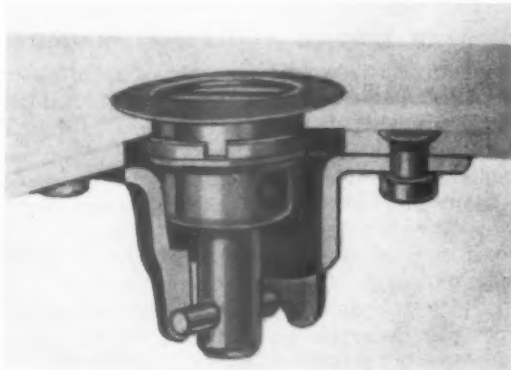
QUARTER-TURN FASTENERS IN PRODUCT DESIGN

Quick-release fasteners are especially adaptable in products where frequency of unfastening and refastening are important design considerations

by J. R. Newcomer
Chief Engineer
Camloc Fastener Corp.



A quarter-turn fastener consists essentially of a spring-loaded stud assembly used in conjunction with a one-piece receptacle featuring a cam action to hold the rotating member in place under tension.



The complexity of modern equipment and the marked emphasis on flexibility and ease of maintenance have focused importance on the selection and proper application of quick-release fasteners such as the quarter-turn fastener. A good working knowledge of the factors affecting their selection and use is important to the design engineer.

A quarter-turn fastener consists essentially of a spring-loaded stud assembly used in conjunction with a one-piece receptacle featuring a cam action to retain the rotating member in place under spring tension. Fastening or unfastening requires only a quarter-turn of the stud. During fastening, the stud is depressed against the stud spring until proper engagement of cross-pin and cam-locking surface is achieved. A quarter turn of the stud is then sufficient to lock the assembly.

Because of the spring loaded stud, some axial pressure is usually required while turning. The heads are provided with a variety of means for turning, such as a screwdriver slot, wing head, knurl, etc. In the released position, the stud is ejected by the stud spring which serves as a "flag" and minimizes hang-up of the joint.

These fasteners are used to secure panels, cowlings, and doors to aircraft and mobile equipment. They are used on special-purpose machinery which may require frequent shutdown and adjustment to different sizes, shapes, and types of items being processed. In the electronics industry, quarter-turn fasteners are used in packaging "black-box" type sub-assemblies such as amplifiers and power supplies, and for fastening chassis, racks, and other major sections of electronic systems. Rapid servicing and ease of withdrawal and re-installation, as well

continued

Use of Quarter-Turn Fasteners, continued

as absolute reliability, are major selection factors.

The food industry, utilizing complex packaging machinery which must be readily adapted to different production batches with a minimum of downtime, makes extensive use of this type of fastener. Conveyor containers which must be changed to suit different package sizes may require as many as one thousand fasteners in a large machine! In some types of production, changes are required several times a day. In such instances, the economic use of the machine can depend on the quarter-turn fastener.

USED IN LIQUID PROCESSING EQUIPMENT

In liquid processing industries, pumps, valves and similar flow elements may require frequent cleaning, either to eliminate residues, or to accommodate different flow products. Here, the quick-release fastener permits easy access to the internal portions of the equipment.

There are many applications in which the frequency of unfastening and fastening, rather than saving time, may suggest the specification of a quarter-turn fastener. Servicing, adjustment, or routine periodic checking become especially simple. On military-approved sizes 5 and 7 (see MIL-F-5591A-ASG) 40,000 cycles of unfastening and fastening are required.

In the airframe industry, quarter-turn fasteners help simplify servicing and overhaul, and meet rigid environmental requirements including severe vibration. The supersonic F-105 Thunderchief, Republic's fighter-bomber, uses quarter-turn fasteners on the fuselage, pylons and fairings providing access to important internal components. Millions of quarter-turn fasteners have been used, not only on the structure of modern aircraft, but in many less critical internal locations.

WHEN TO SELECT SPECIFIC FASTENERS

Serious consideration of available fastener types, and their optimum application can result in a marked improvement in the overall suitability of a piece of machinery. Of course, the time to choose the fastener is in the early design phase, and not after most items have been frozen. There have been

many instances where special tooling and higher unit costs have occurred because the selection of a suitable standard fastener had been delayed until it was too late.

FEATURES OF QUARTER-TURN FASTENERS

The quarter-turn fastener is distinguished by a number of features which makes its use especially desirable to design and product engineers. (The features vary somewhat from one manufacturer to another.) The receptacle is a single rugged piece. The stud remains secured in the outer panel so that parts can not be lost. A single stud may be removed without disturbing adjacent studs, to facilitate replacing a damaged or worn stud with the panel still attached.

The long cam surface of the receptacle provides uniform locking torque, a positive stop, and a detent for positive retention, even under extreme vibration. The engagement of the stud pin in the detent can be both felt and heard. Grommets are used with the stud assembly in the heavier series to protect the outer panel against abrasion, a function performed by the spring cup in the smaller sizes.

Among the less functional features is the neat appearance afforded by the simplicity of the fastener assemblies. When uniformly installed, the alignment of stud slots or projections is likewise uniform. Unfastened studs protrude, and are instantly recognizable due to their being spring-loaded. The net effect is to provide a modern, attractive, and efficient appearance to finished equipment.

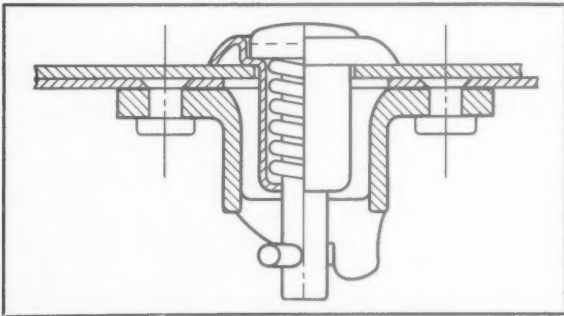
MILITARY SPECIFICATIONS

Quick release fasteners for panels are covered by Military Specification MIL-F-5591A (ASG) 2 October 1953. The military specification provides at least a measure of standardization of quick release fasteners. QPL-5591-2 31 March 1954, Military Qualified Products List of Products Qualified Under Military Specification MIL-F-5591 (ASG) lists qualified manufacturers on each of the types of standard fastener.

While military requirements very often lay a foundation on which a manufacturer may develop a line of standard quarter-turn panel fasteners, the actual line may include a variety originally designed for industrial applications.

CONSIDER SERVICE AND PERFORMANCE

Standard fasteners by the leading manufacturers are sufficiently varied to meet the widest range of requirements. While more expensive than conventional fasteners, the higher cost of properly applied quick-release fasteners should be considered in terms of servicing time, reliability and performance. The key to successful application lies in recognition of the fastener problem at an early stage of design. Tooling expense and production delays in the design and manufacture of special types can occur as the result of waiting too long before paying attention to the fastener. •



Sectional view of a quarter-turn fastener, showing its application in joining two plates securely together.

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Here is a complete, 156-page, hand tool buying guide for purchasing agents, engineers, production and maintenance officials — anyone concerned with the use of hand tools for assembly, maintenance, field service and original equipment repair kits.

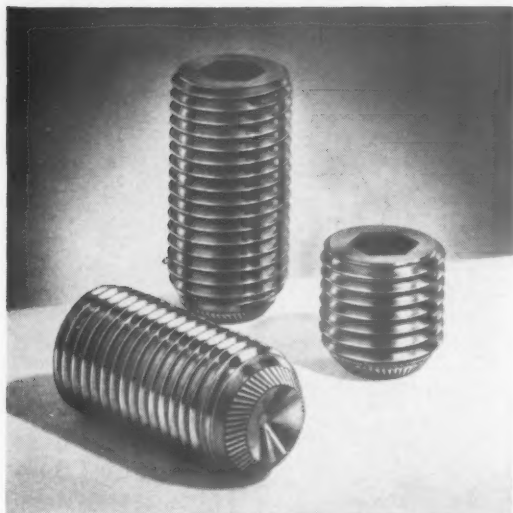
Users of power-driven nut runners and impact wrenches will find this book a handy order guide to answer every socket need. Every type, every size is tabulated with important dimensions and specifications listed clearly.

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RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES

Screw Size	Unbrako	(in.-lb.)		Minimum Differential %
		Set Screw B	Set Screw C	
# 4	5	3.9	3.5	28
# 5	9	7.8	7.4	15
# 6	9	7.8	7.4	15
# 8	20	14.7	14.5	36
# 10	33	26.5	25	25
1/4	87	62	60	40
3/8	165	122	125	32
1/2	290	198	225	29
5/8	430	309	350	23
3/4	620	460	500	24
7/8	1225	1106	1060	11
1	2125	1540	1800	18
	5000	3660	4600	9
	7000	5025	6500	8

High torque UNBRAKO socket sets are available as follows: Sizes, #0 through 1 in.; materials, alloy steel and 18-8 stainless steel; Types, plain cup point (microsizes and stainless)—self-locking with knurled cup point (#4 through 1 in.)—self-locking with Nylok (plain cup point).

High Torque UNBRAKO socket set screws

have up to 40% more holding power

Holding power—a vital factor in the selection and application of a set screw—is the result of the seating force developed by tightening the screw. Invariably the tighter a screw is wrenched into place, the greater will be the holding power. Recommended seating torques for High Torque UNBRAKO socket set screws are up to 40% higher than those for ordinary socket set screws. And the cup point, knurled counterclockwise, resists their backing out under vibration.

In addition to greater holding power, dimensional accuracy of length and OD, with consistent physical and mechanical properties from lot to lot, makes high torque UNBRAKO socket screws ideal for automation. Major diameters are held strictly to Class 3A thread tolerance to permit automatic feeding with-

out jam-up. Socket depth and size are highly uniform to permit the driver to engage the socket in a split second and drive the screw home with speed and precision. Threads are fully formed to Class 3A fit to make the whole screw stronger and provide accurate mating. Heat treatment, in atmosphere controlled furnaces, prevents decarburization and provides hardness and strength for long wear.

High torque UNBRAKO socket set screws are stocked by authorized SPS industrial distributors. Ask the one nearest you for complete details. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 78, Pa.

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WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 68. Just circle the number on the card matching the number following the description. We'll do the rest.

TURNING UNIT CHAMFERS WASHERS AUTOMATICALLY

A machine automatically turns the outside cylinder of washers and cuts the chamfer on the beveled edges. A snug fit between washer and hexagonal screws and nuts is the reported result.

The unit is available in three sizes with processing capacities from 2400 to 3600 washers per hour.

The machine eliminates individual hand feeding of washers into a chamfering machine. A sorting device brings the washers coming from the magazine to the mandrill, either directly or after turning them over, depending on the position of the edge, beveled during manufacture.

J. & W. Neuhaus, Zechenstrasse, Cologne, West Germany.

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WATERBASE ADHESIVE IS SELF-VULCANIZING

An all-purpose water-base adhesive is reported to combine the strength and durability of solvent type adhesives with the economy of latex cements.

Kwick Latex Contact Cement is self-vulcanizing and has a long "open time," so that it is possible to get a strong bond in a few minutes or a few hours.

Neither heat nor pressure is required when the coated surfaces are placed together. It may be thinned, is non-flammable and does not require completely cleaned surfaces prior to application.

Adhesive Products Corp., 1660 Boone Ave., New York 60, N.Y.

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SILVER BEARING STAINLESS SOLDER ALLOY

An alloy is reported excellent for high capillary joining of nine metals and the finished joint can be chrome plated.

Ambraze 4300 can be used with torch or soldering iron, has a melting point of 425°F, tensile strength of 14,000 psi, shear (copper to copper) of 11,200 psi and is available in one lb. spools.

American Brazing Alloys Co., P.O. Box 11, Pelham, N.Y.

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SPRING-TENSIONED DRIVER FOR MINIATURE SCREWS

A spring-tensioned screwdriver, originally designed for use by telephone installers and repairmen, is now available to anyone who works with miniature screws.

The tool contains a spring-tensioned, pointed plunger which runs through the bit to exert a steady pressure upon the small screw or piece part. This insures positive seating, whether or not there is a hole in the screw slot. The bit is double ended, with two sets of points, one set on either end.

The screwdriver is knurled for almost its entire 4½" length for sure gripping. The handle is also equipped with a rotating knob which permits the screwdriver to turn easily in the hand as it is used.

Suttle Equipment Corp. 135 S. LaSalle St., Chicago 3, Ill.

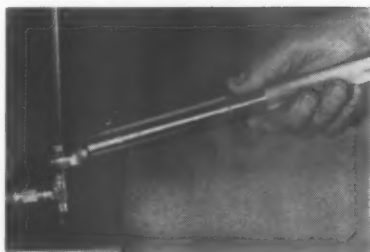
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TORQUE WRENCH PRESET FOR SPEED, ACCURACY

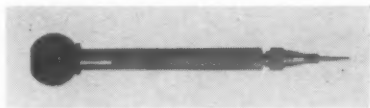
Pre-set torque wrenches, designed for tightening flare nuts, eliminate the need for compensating torque settings. Pre-set by the manufacturer sealed, and clearly marked with the set torque, workers tighten until a distinct snap or "pop" is both heard and felt; this indicates that the correct torque has been reached. There are no dials to read, no settings to make, no figures to look up or translate.

No maintenance or special care is required as the new wrenches have been specially developed to take hard, continuous use. Endurance tests indicate they will remain accurate within 3% after as many as 75,000 operations. Damaged or worn wrench fittings can be readily replaced without the danger of upsetting or disturbing the balance of the calibration.

A complete line of four basic models



(See 5)

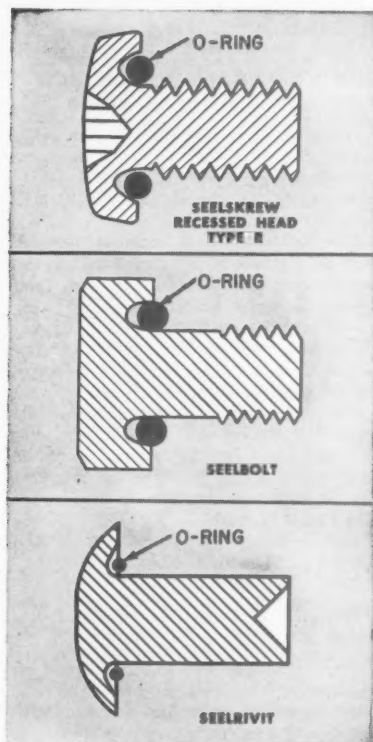


(See 4)



(See 1)

SEELSKREWS® SEELBOLTS® SEELRIVITS® *High Pressure Self-Sealing HARDWARE*



- Removable and static self-sealing screws, bolts and rivets.
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ranging in size from $\frac{3}{8}$ " to $1\frac{1}{2}$ " is available. Torque values range from 20 lbs. to 3000 lbs.

Skidmore Engineering Co., 5130 Richmond Rd., Bedford Heights, Ohio.

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BONDING KIT CONTAINS FIVE METALS, EPOXY

A plastic metal kit contains one pint of clear epoxy, plus five jars of powdered metals, to be mixed for meeting any metallic bonding need. The Flawmaster kit contains aluminum, brass, zinc, iron and stainless steel.

Carl H. Biggs Co., Dept 1025A, 2255 Barry Ave., West Los Angeles 64, Calif.

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ALUMINUM WIRE FOR GAS, ELECTRIC FUSION WELDING

An aluminum welding wire with 30,000 psi tensile strength is designed as an all-purpose filler material for both gas and electric fusion welding. Its principle alloying element is 5% silicon. It will join such wrought alloys as 5052, 6053 and 6061.

Because number 4043 has a low melting point (1055°F), it produces a wide solidification range which keeps the metal plastic somewhat longer. This feature enables the metal to fill solidification voids without setting up stresses in the parent metal. Instead of such stresses being transferred to the joined parts, the stresses are relieved in the molten welded filler.

Dalweld Co. Inc., 13 Bertel Ave., Mt. Vernon, N.Y.

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FLASH-BUTT WELDER BUILT FOR CONTINUOUS STRIP JOINING

For the continuous end-to-end fastening of hot rolled, low carbon steel, a flash-butt type welder has been designed for mill and process operations.

The BPW-3-400H skelp welder will handle strip ranging from .060" to .200" thick and 12" to 22" wide, or a maximum capacity of 4.5 sq. in. cross sectional area of mild steel, and 2.6 sq. in. of stainless steel.

The upset force is adjusted to a maximum of 90,000 lbs., clamping force,

ELECTRIC CARRIER SYSTEM NEW IDEA FOR STORAGE



A floor-to-ceiling storage wall, that "comes to life at the touch of a button" for delivery of parts or materials anywhere in a plant, is made up of an electrically-operated travelling carrier, steel storage drawers, and a compact loading or transfer station.

The "retriever" can handle loads up to 4000 lbs. brought to the transfer station by conveyor, rollers, fork truck, handcart, or specially designed storage and transport units. Materials to be stored can be on skids or pallets, in bins or trays, or in any other condition normal for handling operations.

At the touch of a selective electrical control, the retriever picks up the load to be stored, transports it horizontally and vertically to any desired area in the storage wall, then rolls it gently into a protected and dust-free drawer or compartment.

Tiers of drawers can be added horizontally or vertically to make the storage wall as long and as high as desired,

continued

135,000 lbs. Maximum platen opening is 8", and flashing action is accomplished by the right hand platen. Pressure lubrication is provided. Transformer tap switches offer 32 steps of heat regulation. The welding current is rated at 400 kva at 50% duty cycle. Silicone insulation of adequate section is used to minimize heat loss.

Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.

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Assembly and Fastener Engineering



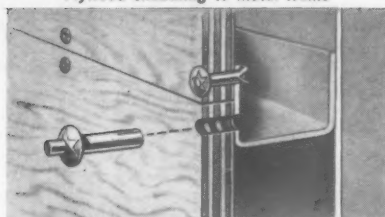
TAKE THIS SHIRT-SLEEVE SHORT-CUT TO MORE EFFICIENT ASSEMBLY!

Are you open-minded about methods of permanent fastening? If so, it will pay you to call in your nearby Thomson Fastening Man. Ask him to look at your new-product sketches or old-product assembly lines. Chances are, he can tell on the spot whether you can speed production or cut costs with time-tested automatic positioning and fastening techniques. If not, he'll pass your problem, drawings or samples along to his home-office engineers who know when riveting beats stapling, welding, cementing and other permanent fastening methods.

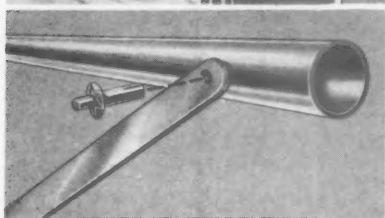
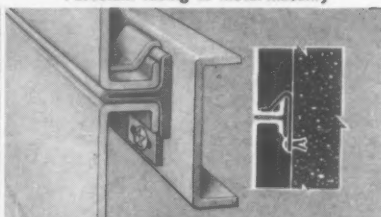
Your Thomson Fastening Man sells by giving shirt-sleeve service. He's more interested in solving fastening problems than in selling rivets. So, use him freely as your direct contact with 74 years of fastening experience. Why not make a date with him soon? Write today to Dept. AS.



Plywood sheathing to metal frame



Porcelain facing to metal-masonry

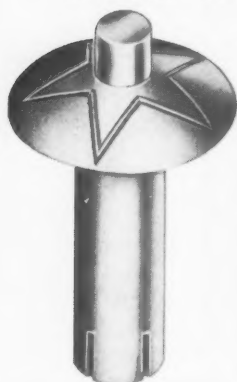


Metal components riveted together



Name plates secured to equipment

for high speed riveting with an ordinary hammer

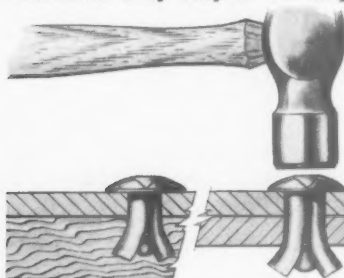


★ STAR PIN-GRIP

Star Pin-Grip hammer-drive blind rivet eliminates the need for explosives, special tools or special skills. Pin-Grip does the job of a conventional rivet—faster, easier, safer, with real economies in time and labor.

Aluminum alloy body of Pin-Grip is

assembled with a stainless steel, knurled drive pin (or on special order with aluminum drive pin). Wide range of Pin-Grip sizes available with these head styles: Universal, 100° Counter-sunk, Full Brazier, Panel, Splash Flat and Splash Round.



*An ordinary hammer does
the job with a simple one-two!*

1. Insert Star Pin-Grip into pre-drilled hole
2. Drive knurled pin flush with rivet head



metal to wood

metal to metal



STAR EXPANSION

Mountainville, New York

Please send illustrated Pin-Grip Catalog

Name _____

Company _____

Address _____

City _____

Zone _____

State _____

AF 4

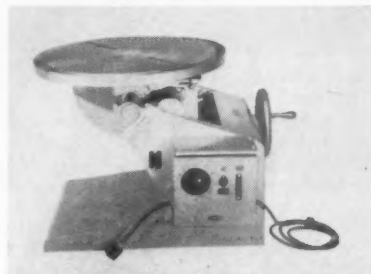
Use postpaid card. Circle No. 233

or a unit can be fitted into limited space beside a press operator. Virtually any item from trays of parts to heavy-duty electric motors can be handled, with storage of up to 4000 pounds in a single compartment. Dimensions of the compartments can be tailored to any needs.

Triax Equipment Co., 3921 Mayfield Rd., Cleveland 21, Ohio.

Use postpaid card. Circle No. 9

TURNTABLE WELDING POSITIONER LOADS 500 LBS.



Load capacity of a turntable welding positioner is 500 lbs. at center of gravity 6" above the table surface and 3" off center of rotation.

Infinite speed range is available from 1/4 to 5 rpm. Table speed is constant and direction of rotation is reversible.

The table top can be tilted up to 135° while loaded. The top is removable to permit fixtures for special jobs to be mounted on the unit. The slotted turntable top is 26" in diameter.

Miami Specialties Co., Trade Rd., Troy, Ohio.

Use postpaid card. Circle No. 10

VIBRATORY PARTS FEEDER WITH BOWL SIZES 12 TO 36"



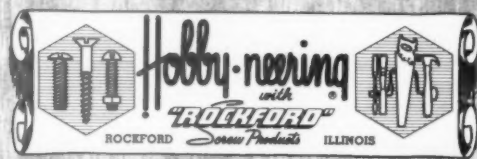
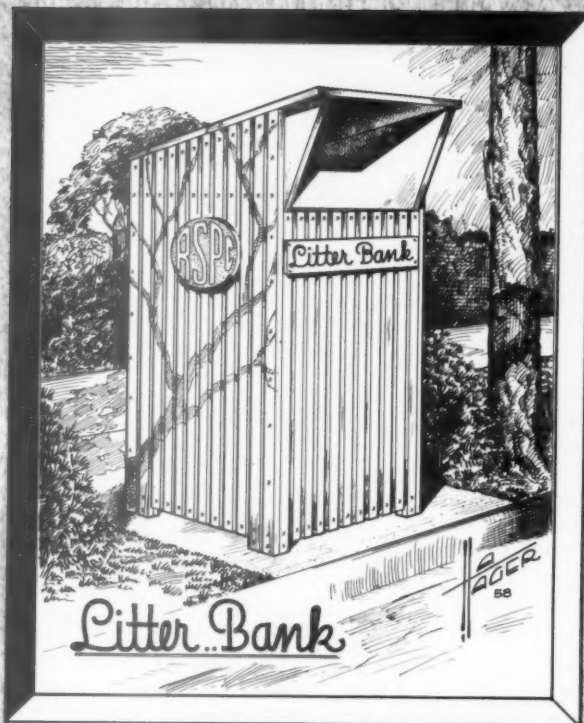
A line of vibratory parts feeders is said to deliver increased feed rate through a new method of mounting the torque motor, with smoothness of feed due to proper distribution of suspension points. There are no working parts to wear out.

Factory orientation of parts in standard bowl sizes from 12 to 36" diameters is available.

Bowls are made of cast aluminum, magnesium, stainless steel or plastic. The torque motor vibrates the bowl to feed the parts at the rate of the cycles of the input alternating current.

General Automation, 538 Toluca Park Dr., Burbank, California.

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ORIGINAL DESIGNS

APRIL 1959

COPYRIGHT 1959 ROCKFORD SCREW PRODUCTS CO., PRINTED IN U. S. A.
2801 NINTH ST. ROCKFORD, ILL.

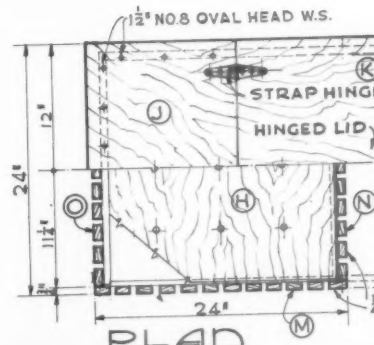
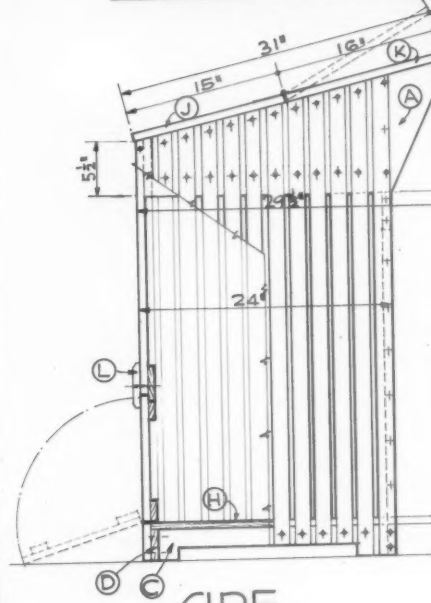
For Additional Copy of this Plan
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ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois



ROCKFORD
HOME WORKSHOP
PROJECT of the
MONTH

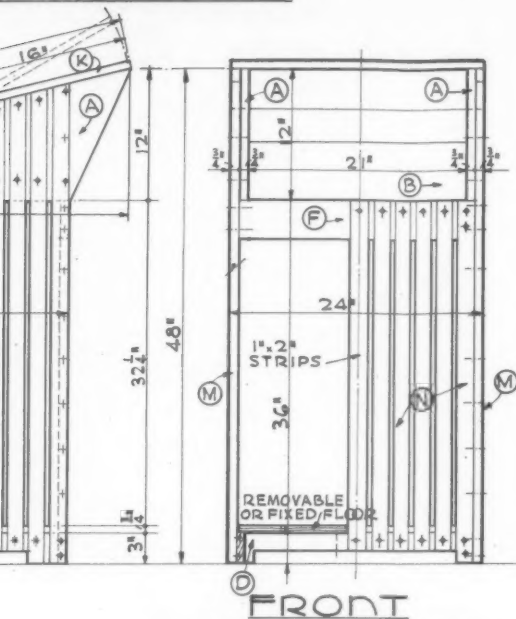


Litter Box

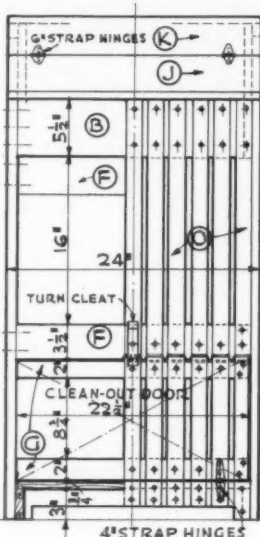


HAGER DESIGN STUDIO, 10-26-58

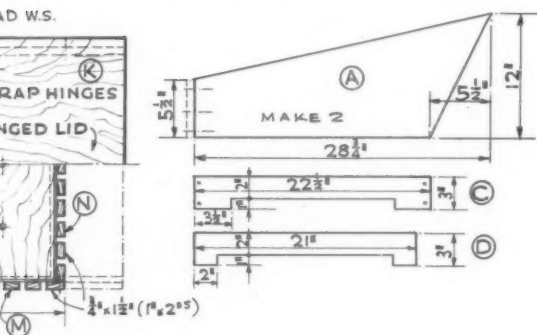
Bank



SCALE: INCHES 0 1 2 3 4 5 6 7 8 9 10 11 12



BACK



BILL OF MATERIALS					
2 PCS.	$\frac{1}{2}$ " x 12" x 29"	"A"	24 PCS.	$\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 48"	"M"
1 "	$\frac{1}{2}$ " x 5 $\frac{1}{2}$ " x 22 $\frac{1}{2}$ "	"B"	11 "	$\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 36"	"N"
2 "	$\frac{1}{2}$ " x 3" x 22 $\frac{1}{2}$ "	"C"	11 "	$\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 42"	"O"
2 "	$\frac{1}{2}$ " x 3" x 21"	"D"	1 PR.	6" STRAPHINGES	
2 PCS.	$\frac{1}{2}$ " x 3 $\frac{1}{2}$ " x 22 $\frac{1}{2}$ "	"E-F"	1 "	4" "	
2 "	$\frac{1}{2}$ " x 2" x 22 $\frac{1}{2}$ "	"G"			
1 PC.	$\frac{1}{2}$ " x 22 $\frac{1}{2}$ " x 22 $\frac{1}{2}$ "	"H"			
1 "	$\frac{1}{2}$ " x 15" x 24"	"J"			
1 "	$\frac{1}{2}$ " x 16" x 24"	"K"			
1 "	$\frac{1}{2}$ " x 1" x 4"	"L"			

NOTE: EXTERIOR CAN BE COVERED WITH MASONITE, METAL OR PLASTIC, IN WHICH CASE SIMPLY BACKING.

INSTRUCTIONS:

INTEREST IN THIS LITTER BANK CAN BE AN INVESTMENT THAT WILL PAY DIVIDENDS BY AIDING TO MAKE OUR HIGHWAYS & CITY STREETS FREE OF UNSIGHTLY LITTER & DEBRIS. CIVIC ORGANIZATIONS, BOY'S CLUBS & SERVICE CLUBS CAN MAKE PROJECTS OF THIS IDEA, "THE LITTER BANK"

BUSINESS FIRMS CAN TAKE PART IN THE PROMOTION ALSO. DISTRIBUTION OF PAPER BAGS WITH PRINTED MESSAGE & NAME OF SPONSOR TO BE ATTACHED TO KNOB OF CAR DOOR OR DASH MAKES GOOD RECEPTACLE FOR LITTER USUALLY THROWN OUT OF THE WINDOWS. A LITTER BANK LOCATED AT A CONVENIENT PLACE MAKES DISPOSAL OF FULL BAGS EASY. (SERVICE STATIONS & PARKING LOTS)

TO MAKE THIS PROJECT SIMPLE TO CONSTRUCT, STANDARD DIMENSION LUMBER IS USED. "ROCKFORD" QUALITY CONTROLLED, WOOD SCREWS MAKE ASSEMBLY EASY & STRONG.

CUT & ASSEMBLE BASE & TOP FRAMES, APPLY 1" x 2" VERTICALS, SAW OFF TO ANGLE OF TOP. INSTALL NAILING CLEATS "B" & "F", MAKE CLEAN-OUT DOOR, LOOSE FLOOR PANEL, TWO HALVES OF TOP, APPLY HINGES ETC. & YOU'RE READY TO SAND & PAINT BRIGHT COLOR.

I HAVE DESIGNED THIS PROJECT AS A PUBLIC SERVICE. ALTHO THESE FOLDERS ARE COPYRIGHT, JUNIOR ACHIEVEMENT GROUPS CAN GET PERMISSION BY WRITING ROCKFORD SCREW PROD.

MAKE "THE LITTER BANK" ONE OF YOUR COMMUNITY PROJECTS. GOOD LUCK.

"Let me know how you like this idea."

HERM.

Hobby-neering

SERIES.. NO. 9

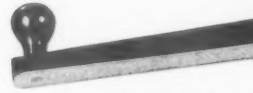
PROJECT	Designed by
3	A. ROGER
USE FOR COMMERCIAL PURPOSES IS STRICTLY FORBIDDEN	OF ROCKFORD

★ HERE THERE AND EVERYWHERE with "ROCKFORD" Screws



HAND SANDER
(No. 20000 with fine sanding sheet)

SANDER-PLANE
(No. 19918)



NEW PERMA-MIRACLE TOOL

Manufactured by:
SKIL CORPORATION
5033 North Elston Ave.
CHICAGO 30, ILLINOIS



Fanno

Quality
SAWS
and
ACCESSORIES

Manufactured by
FANNO
SAW WORKS
P. O. Box 52
CHICO, CALIF.

1/2" Screws and Bolts ★



NEW PERMA-GRIT
TOOL TOOLS



Fanno

Quality
SAWS
and
ACCESSORIES

Manufactured by:
FANNO
SAW WORKS
P.O. Box 527
CHICO, CALIFORNIA

★ HERE THERE AND EVERYWHERE with "ROCKFORD" Screws and Bolts ★



450W
CHAIR



250-4

TV TRAY SET



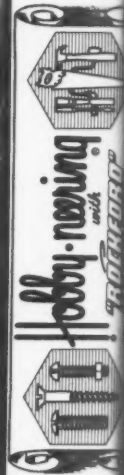
675W
LOUNGE

MANUFACTURED BY:

ASHBY

PRODUCTS DIVISION
METAL FORMING CORPORATION
1601 WOODSON ROAD
ST. LOUIS, MISSOURI

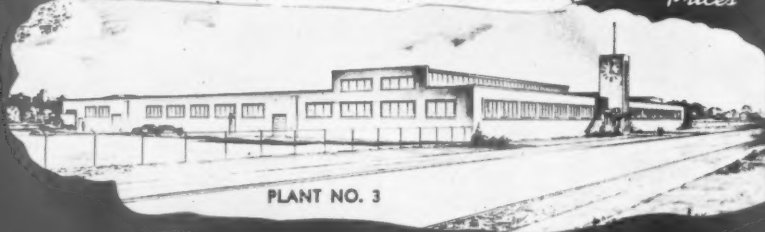
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ROCKFORD SCREW PRODUCTS CO.



"ROCKFORD"
HOME WORKSHOP
PROJECT of the
ROCKFORD SCREW PRODUCTS CO.



PLANT NO. 2



PLANT NO. 3

"ROCKFORD"
Screw Products Co.
ROCKFORD ILLINOIS

GENERAL OFFICES
AND PLANT NO. 1

*Write
for Latest
Catalogs
and
Prices*

**"ROCKFORD" Quality - Controlled Threaded Fasteners
Within Reach of Any INDUSTRY.**

A Complete Line of Fasteners Fabricated in Our Three Modern Plants

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ROCKFORD SCREW PRODUCTS CO.

Rockford, Illinois



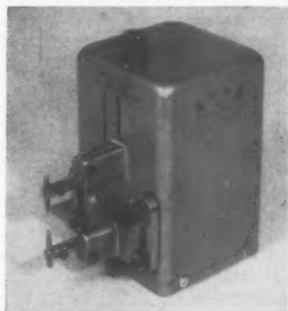
"ROCKFORD"

HOME WORKSHOP

PROJECT of the

MONTH

MINIATURE WELDING HEAD REQUIRES 4½" BENCH SPACE



A miniature resistance welding head requires only 4½" of bench space. The Model 1032 is designed for ultra-fine welding.

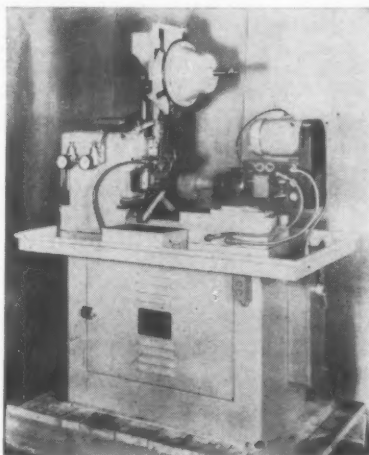
Applications include joining gold-gallium wire to kovar, platinum filaments to tinned brass posts, aluminum foil to itself, tantalum to nickel and others.

The design features twin ball races for vertical electrode motion. Exactly repeatable welds claimed to be made at electrode pressure of only 4 oz. The head is foot-pedal operated. Maximum capacity is 80 watt-seconds.

Weldmatic, 280 N. Halstead Ave., Pasadena, Calif.

Use postpaid card. Circle No. 12

HOPPER FED DRILLING, TAPPING MACHINE

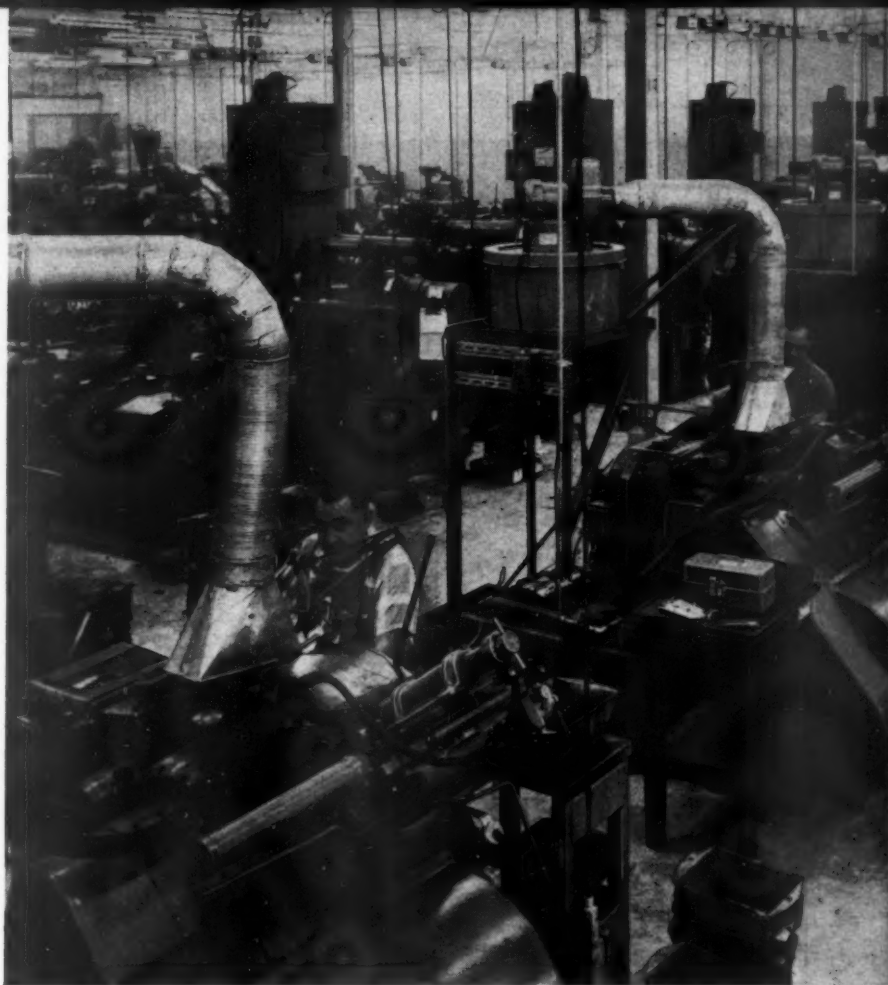


A fully-automatic hopper-fed drilling or tapping machine positions and holds rivets or other similar headed parts for secondary operations.

The Beco 409 clamps the heads of the work axially, eliminating distortion which would cause the tool to weld to the workpiece.

Other features are: fast operation, the absence of cams for spindle advance, and the ability to either drill or tap, tapping to within 1/16" of the bottom of blind holes.

Operating from electrically controlled compressed air, the speed of the spindle advance and retract is controlled by knobs.



NEW This is the ~~old~~ grind at ALLEN

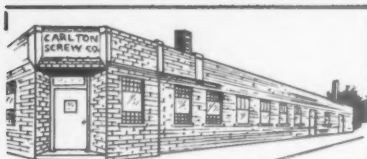
A quarter of a million square feet of space in the great new Allen plant is devoted to precision fasteners — and much of it houses batteries of the latest, high-speed automatic centerless grinding equipment. Here you see a close-up of the grinding section set up to produce dowel pins at the rate of one a second per machine.

Allen's vast new facilities assure constant standards of uniformity, accuracy, strength and fit, many of which are duplicated nowhere else. Now there's more reason than ever to make Allen *your* Buy-Word for socket screws, keys, pipe plugs and dowel pins.

Speaking of dowel pins — specify *Allen* for great strength where you need it most. Made of Allenoy steel, they're surface hardened to 62-64 Rockwell C. Core hardness 47-53. Case depth .010" to .020". Shear strength from 160,000 to 180,000 psi. Precision-ground to ±.0001", with a mirror finish of 6 RMS max.

In stock at your Allen Distributor . . . in diam. from 1/8" thru 1" . . . lengths from 3/8" thru 6". Also in two standard oversizes — .0002" for press fit, .001" for repairs. For more details, ask your local Distributor, or write directly to the Allen Manufacturing Company, Hartford 1, Conn.





SOCKET SET SCREWS

Manufactured in strict conformance to physical and dimensional specifications as per ASA B18.3

CURRENT INVENTORY

(Cup point except as noted)
(Out of stock items fabricated in 10 days)

4-40 x 1/8	26M
4-40 x 3/16	16M
4-40 x 3/16	
Flat pt.	10M
4-40 x 1/4	40M
4-40 x 5/16	15M
6-32 x 3/32	
Oval pt.	2M
6-32 x 1/8	100M
6-32 x 3/16	70M
6-32 x 1/4	150M
6-32 x 1/4	
Fluted Cone	35M
6-32 x 5/16	25M
6-32 x 3/8	10M
6-32 x 7/16	15M
6-32 x 1/2	18M
6-40 x 1/8	
Fluted Cup	32M
8-32 x 1/8	130M
8-32 x 3/16	70M
8-32 x 1/4	45M
8-32 x 5/16	18M
8-32 x 3/8	22M
8-32 x 7/16	3M
10-24 x 1/4	9M
10-32 x 3/16	29M
10-32 x 1/4	15M
10-32 x 5/16	12M
10-32 x 3/8	25M
10-32 x 1/2	10M
10-32 x 3/4	4M
1/4-20 x 1/4	10M
1/4-20 x 5/16	5M
1/4-20 x 3/8	6M
1/4-20 x 1/2	68M
1/4-20 x 9/16	
Flat pt.	39M
1/4-28 x 1/4	
Nylon Insert	
Knurled Cup pt.	40M
5/16-18 x 3/8	18M
5/16-18 x 1/2	10M
5/16-24 x 7/16	105M
3/8-16 x 1/2	19M
3/8-16 x 3/4	8M

Quantities under 1,000 pcs.
not listed but available

SCREWS — BOLTS — NUTS — WASHERS — RIVETS

Government and Commercial
specifications in all
materials and platings

Phone Uptown 8-7330
TWX CG 2676

CARLTON SCREW CO.
2134 W. Lawrence Ave.
Chicago 25, Ill.

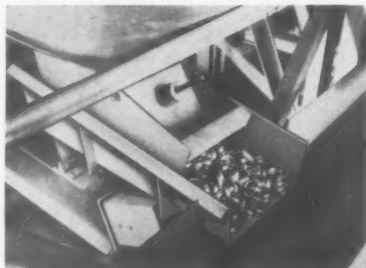
Use postpaid card. Circle No. 235

Conversions are available for tapping wing nuts, tapping small stampings, drilling pins, pointing headed screws, hollow milling and multiple operations.

Batchelder Engineering Co., 125 Main St., Springfield, Vt.

Use postpaid card. Circle No. 13

VIBRATORY PARTS FEEDER WITH RATE-CONTROL FEED



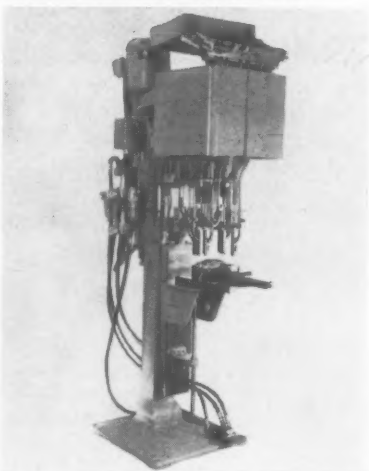
An electromagnetic vibrating feeder is said to also accomplish efficient, rate-controlled feeding of bulk parts.

Movement of the parts is achieved by the electromagnet drive which produces 3600 smooth vibrations a minute, controlled by a rheostat in the feeder's separate controller—which can readily be arranged for completely automatic operation.

Synton Co., 1308 Lexington Ave.,
Homer City, Pennsylvania.

Use postpaid card. Circle No. 14

MULTIPLE SPINDLE SCREWDRIVER MACHINE



A hopper-fed multiple spindle screw-driving machine simultaneously selects up to 10 machine screws, of two different lengths, feeds and drives the fasteners to desired torque.

Designed for high-production where fixed setup is practical, the machine can also be adapted to other applications having different screw patterns by installing the correct spindle and chuck locating blocks.

Automatic screw driving eliminates the stresses upon materials caused by unevenly-distributed pressure in manual screw driving. A simple sliding fixture is used to position the work pieces.

Cook & Chick Co., 2415 W. 24th St.,
Chicago 8, Ill.

Use postpaid card. Circle No. 15

RESISTIVE ROSIN FLUX FOR CIRCUITRY SOLDERING

An activated rosin flux leaves an unusually resistive residue after heating—features of prime importance in circuitry soldering.

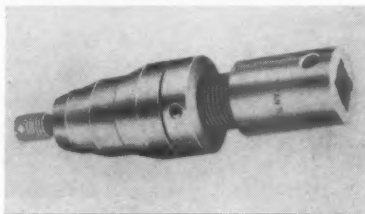
Alpha 610, in its raw state, has relatively low conductivity. During soldering, the rosin's conductive constituents are destroyed; the flux residue becomes highly resistive.

Other features claimed for the flux are its qualities of instant wetting, excellent capillary action and a moderate drying rate.

Alpha Metals, Inc., 56 Water St.,
Jersey City 4, N.J.

Use postpaid card. Circle No. 16

STUD DRIVER SETS SELF-TAPPING INSERTS



A stud driver sets self-tapping or regular inserts in an accurate position. Selective positioning is accomplished by a wide-range, ball-bearing mounted depth gage on the driver.

The insert has a primary clutch for driving, secondary positive clutch for reversing. Inserto can be used with a tapping head mounted on a standard drill press, or with automatic air or electric tapping motors when provision is made to keep the tool at right angle to face of casting.

Titan Tool Co., 52 Main St., Fairview
(Erie County), Pa.

Use postpaid card. Circle No. 17

SAFETY CAN FOR CLEANING METAL PARTS IN GASOLINE



The problem of cleaning small metal parts in gasoline is solved by a new safety bench can. It has a spring-actuated dasher which is perforated and flush with the top of the can, to reduce evaporation losses and minimize explosive vapors. The dasher, coupled with baffles, protects contents of the can from fire. The entire can is constructed of heavy-gauge coated sheet steel, with red enamel exterior finish.

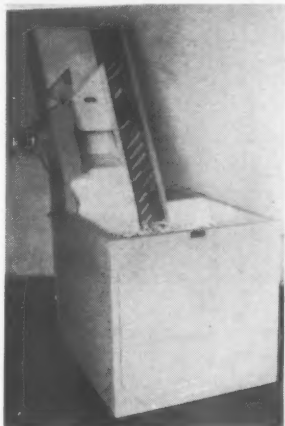
Also developed is a drip can, to be used to reduce fire hazard where a faucet may drip or where a slow leak is likely.

Eagle Mfg. Co., 3005 Charles St.,
Wellsburg, W. Va.

Use postpaid card. Circle No. 18

Assembly and Fastener Engineering

**PARTS-FEEDER ELEVATOR
HOPPER STORES 10 CU. FT.**



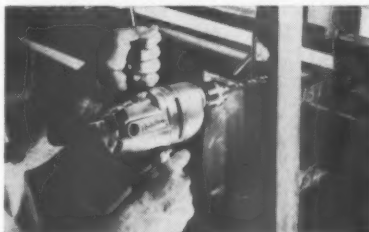
Speeds in excess of 1000 parts fed and oriented per minute are possible with an elevator hopper parts-feeder.

The storage hopper has a capacity of 10 cubic feet and has a loading opening three ft. above floor level. A cleated belt runs through the hopper, picking up and orienting the parts down a track. Mechanical or electronic counting devices can be provided.

U.S. Engineering Co., 40-24 22nd St., Long Island City, N.Y.

Use postpaid card. Circle No. 19

**POWER INCREASE ADDED TO
PORTABLE ELECTRIC DRILLS**



Heavy-duty and light-duty models have been added to a portable electric drill line.

A $\frac{1}{2}$ " drill is reported to have a 62% power-increase over previous models. It drills diameters up to $\frac{1}{2}$ " in steel $\frac{3}{4}$ " in masonry, 1" in hardwood. It includes a geared chuck and key, three-conductor cable and rubber key-holder, and standard space and pipe handles.

For light automotive work, service trades, repair jobs, a $\frac{1}{4}$ " drill weighs three lbs. and has a capacity up to $\frac{1}{4}$ " dia. in steel and $\frac{1}{2}$ " dia. in hardwood.

The Black & Decker Mfg. Co., Towson 4, Maryland.

Use postpaid card. Circle No. 20



**SINCE
1887**



Clean as a Whistle!
because they're WASHED!

Clean washers are essential to today's high standards of clean workmanship. Your assemblies—down to the last nut and bolt—must be clean.

When you use Milwaukee *washed washers*, workers' hands are kept clean. Cleaner workmanship results, assembly lines move faster, costs are lower, profits higher, your customers better satisfied! There is no grease, grime, graphite or other foreign matter to rub off on workers' hands or the work they are handling.

As a plus value, the Milwaukee Wrot Washer washing process includes rust-resistant treatment. It is used on all popular sizes of U. S. Standard and S.A.E. Washers, Rivet Burrs, and Machine Bushings.

Since the introduction of this washing process, industry has specified Milwaukee *Washed Wrot Washers* in a BIG WAY—but whether you specify "washed washers" or not—that's the way they reach you. Clean as a whistle, and made to match your own high standards of quality and cleanliness!

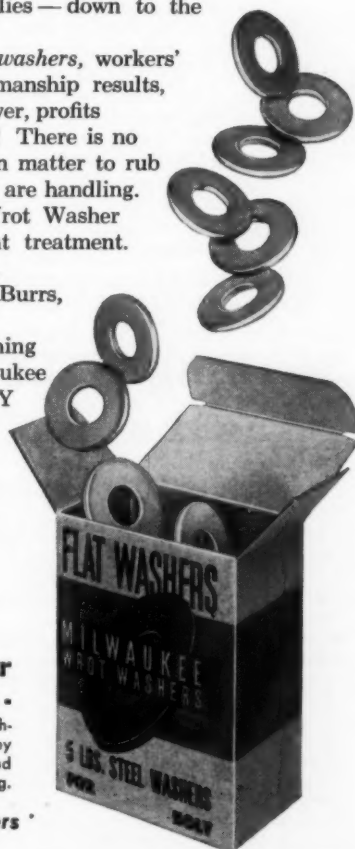
**Specify "Milwaukee Wrot Washers"
for better Quality Control.**

**Modern Packaging for
Easier Identification...**

In keeping with a policy of "dressing up" the washers themselves, by our special washing process, they are now put up in convenient, attractive 1-lb. and 5-lb. packages for easier identification and handling.

Your No. 1 Source for Quality Washers

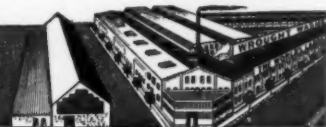
Write for Catalog No. 40



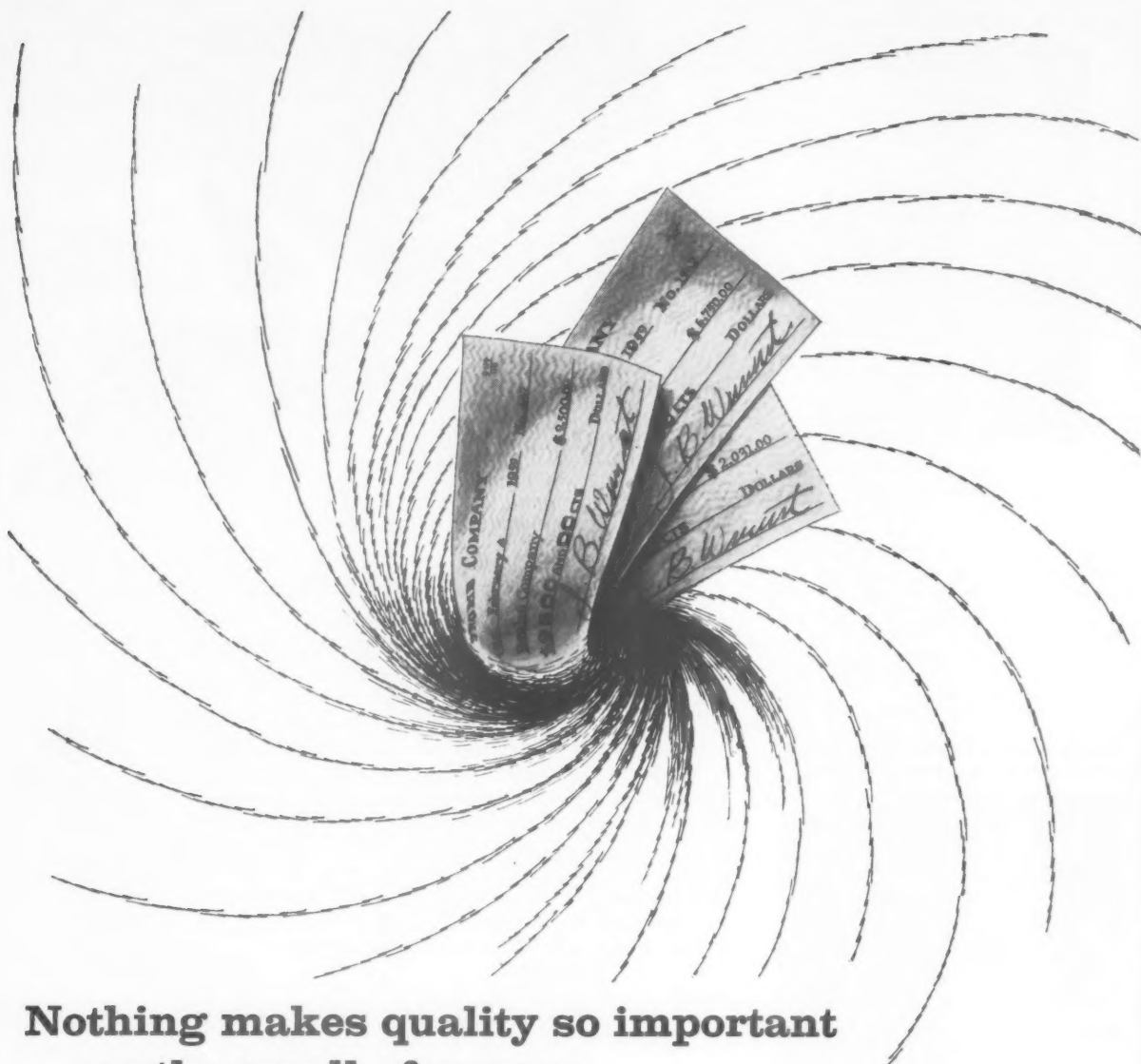
**WROUGHT WASHER
MANUFACTURING CO.**

The World's Largest Producer of Washers

2195 S. BAY ST., MILWAUKEE 7, WIS.



A9-9673



Nothing makes quality so important as the smell of money

Nothing makes quality so important as the smell of money. Especially if the money comes out of your pocket.

Such is the case when you buy fasteners.

This is true because assembly costs are 50-75% of manufacturing charges. Direct labor charges are 81% of that figure while fasteners account for only 19%. Your biggest opportunities for profit improvement, then, lie in reducing the direct labor costs of assembly.

So the saving of a few cents a thousand on the cost of fasteners isn't so attractive when the failures show up. A unit pulled from the production line because of a stripped thread; rejects; more frequent inspections . . . all these eat up your profits.

We believe that quality is what smart industrial buyers really want. And we back up our belief with continuous research to find fasteners that will perform better, cost less, last longer and be easier to use.

It is this belief in quality which underlies our Profit Improvement Program for you — because nothing improves your profits like a quality product that helps you cut your costs.



In every phase of modern fastening and assembling — new products, new applications, new packaging, quality control — American's Profit Improvement Program spells more profit for you. Ask your American Screw Company salesman about these ideas you will find profitable.

The Biggest News in Fasteners comes from

American
SCREW COMPANY

Willimantic, Conn. • Detroit, Mich. • Chicago, Ill.

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Assembly and Fastener Engineering

WHAT'S NEW IN FASTENERS

For further information on any of the fasteners listed here, use the handy postpaid card opposite page 68.

DOUBLE COIL WASHERS OFFER REACTIVE PRESSURE

Double coil spring washers provide reactive pressure to meet most service conditions, plus reactive resiliency to prevent frozen bolted assembly conditions.

Manufactured to ASA and SAE specifications, the washers are available in light, medium, heavy and extra heavy material.

Reliance Div., Eaton Mfg. Co., Massillon, Ohio.

Use postpaid card. Circle No. 26

STANDARD 1600°F BOLTS IN ADVANCED ALLOYS

Standard structural fasteners for use at temperatures up to 1600°F are offered in both airframe and engine bolt configurations.

The bolts are rated at a minimum tensile strength of 155,000 psi at room temperature, 135,000 psi at 1200°F and 85,000 psi at 1600°F.

Rated minimum stress rupture life is 100 hours at 1500°F and 10 hours at 1600°F—in both cases with sustained load of 30,000 psi.

Bolts of these properties have been successfully fabricated from four alloys—M-252, Waspalloy, Udimet 500 and Hastalloy R-235.

Initially, bolts in diameter sizes No. 6 through 1½" are available.

Standard Pressed Steel Co., Jenkintown, Pa.

Use postpaid card. Circle No. 27

FIVE CUTTING FLUTES ON THREAD-CUTTING SCREWS

Three thread-cutting screws for every application in every material offer five cutting flutes on two models and reportedly reduce pressure development by 80%.

The completely formed threads on these tapping screws have sharper cutting edges, and five deep flutes that are of continuous depth. These features make for better clearance of the accumulated material and assure minimum stresses in driving, and avoid the possibility of stripping or galling.

Type F cuts a machine screw thread

as it is turned in, designed for making fastenings in castings, forgings, sheet metal, structural steel, plastics and resin-impregnated plywood.

Pentap, the type B-F, combines the five thread-cutting flutes of the type F with the coarse pitch, widely-spaced threads of type B. Type B-F distributes cutting pressure evenly, lets chips drop to the bottom of the hole, and prevents cracking of material.

Type L is developed for use in nylon, functioning as a combination thread-cutting and thread-forming screw. It cuts a small amount of the nylon to allow the full diameter threads to form.

Parker-Kalon Div., Clifton, N.J.

Use postpaid card. Circle No. 28

LOCK NUT ASSURES UNIFORM BOLT LOADING

Locking over the entire range of bolt thread tolerances, the Uni-Torque lock nut's lock is developed by deflecting the top threads slightly out of their true helix.

The nut starts freely on the bolt until the deflected threads are reached, then requires wrenching into final position. The nut will lock in any location on bolt provided a minimum of 1 to 1½ threads protrude beyond top of nut.

MacLean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.

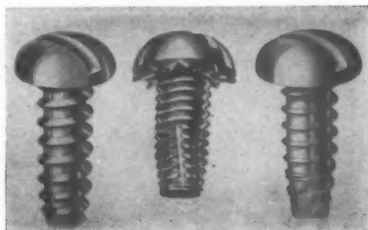
Use postpaid card. Circle No. 29

NEW DESIGN PRINCIPLES IN QUICK RELEASE PANEL NUT

A quick release panel fastener has no springs or pins to break or distort.

Designed on a new principle, the type FR quick release fastener uses a self-locking nut as the latch-lock element in the basket retainer. Requiring only a quarter turn of the bolt to complete the lock-unlock action, the fastener offers new performance features.

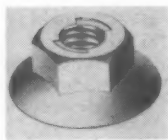
In operation, as the bolt is rotated, the self-locking nut turns from the entry slot of the basket and lifts on the beveled edge of the nut lugs into the basket recess. The lifting action of the nut draws up the screw and attached cover plate into firm, positive con-



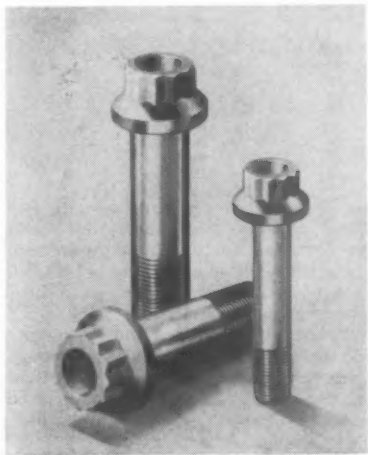
(See 28)



(See 26)



(See 29)



(See 27)

**WE'RE
SPECIALISTS**

...IN DRILLED FILLISTER HEAD SCREWS

This assures you of a quality product, since all of our facilities are devoted to manufacturing DRILLED FILLISTER HEAD SCREWS...to 'AN' and 'MS' specifications.

As the leading manufacturer of DRILLED FILLISTER HEAD SCREWS, AQF can offer you prompt deliveries from a comprehensive stock.

- AN500A AN501A
- AN502 AN503
- MS3523 thru MS35278

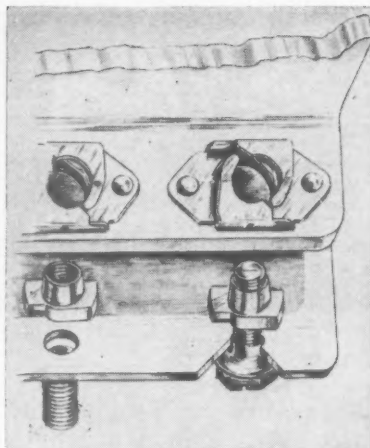
Whether it's Steel, Brass, Stainless or Alloy Steel, AQF has it in stock, or can produce it. One complete source for all your DRILLED FILLISTER HEAD SCREWS.

Write or call for further information.

AIRCRAFT QUALITY FASTENERS INC.

308 Clarkson Ave., Brooklyn 26, N. Y.
INgersoll 2-5750

Use postpaid card. Circle No. 239



tact with the base plate at the preset loading.

Use of a threaded fastener as the locking element permits an infinite grip adjustment for the full length of the bolt. A detent in the basket side prevents the nut body lugs from rotating beyond the fully engaged position and allows continued torquing of the bolt to the exact tension desired.

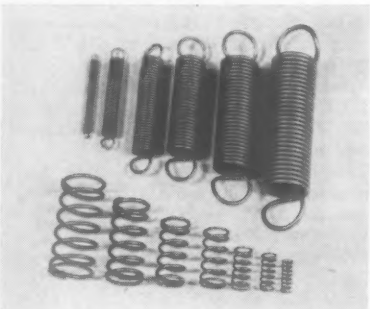
The infinite grip adjustment feature also permits the user to precisely and individually torque all fastener joints equally around the panel.

Any standard bolt of proper thread size may be used. No special tools are required to install or replace either part during assembly or maintenance in the field.

Elastic Stop Nut Corp. of America,
2330 Vauxhall Rd., Union, N.J.

Use postpaid card. Circle No. 30

STANDARD SPRINGS OFFERED IN 500 SEPARATE SIZES



Standardized engineered compression and extension springs for 500 sizes and load capacities are available.

Select-A-Spring, as the new system is called, eliminates the need for engineering drawings from spring users, speeds shipment and reduces costs for small quantities.

Compression spring sizes range from 1/2" to 1 1/2" long, and 1/8" to 3/4" outside diameter, with approximate load ratings from 1 to 20 lb. Extension spring sizes are from 1" to 5" long and 1/8" to 3/4" outside diameter, with maximum load capacities of around 20 lb.

Associated Spring Corp., Bristol, Connecticut.

Use postpaid card. Circle No. 31

NYLON INSULATED METAL RIVETS

A series of plastic insulated metal rivets consist of metal rivets (aluminum, brass, steel or the like) where shank and under-the-head surfaces are covered with a uniformly thick plastic insulation. The plastic insulation, consisting of nylon, extends slightly beyond the metal rivet's head circumference and also beyond the end of the metal rivet.

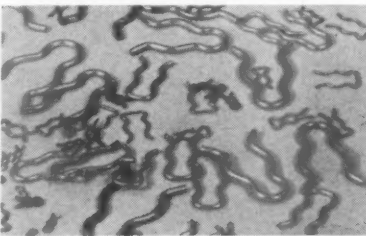


Insulet rivets are used in electrical or electronic applications where it is necessary to fasten two or more metal parts and yet not have the parts connected electrically. Other applications include riveting to ceramic or glass where the nylon sheath acts as a shock absorber to prevent cracking.

Pylon Co., Inc., Attleboro, Mass.

Use postpaid card. Circle No. 32

EXTERNAL COTTERS TO FIT STANDARD DIAMETER RODS

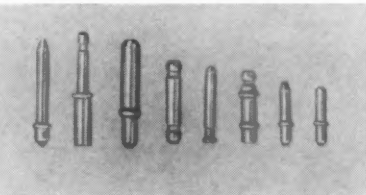


Fifteen sizes of external, or "hairpin," cotters have been standardized as stock items. The cotters have been designed to fit rod sizes in standard increments from .125" to .750" diameter. Of SAE-1095 steel with a cadmium plate finish the 15 standard cotters are shelf items.

Hunter Spring Co., Lansdale, Pa.

Use postpaid card. Circle No. 33

PINS, TUBULAR PARTS BY AUTOMATIC SWAGING



Pins and small tubular parts requiring close tolerances and high dimensional accuracy have been developed for electrical, electronic, and mechanical application. These parts may be beaded, grooved, headed or shouldered to meet any practical requirement.

Swaged pins can be hollow throughout their entire length, making a ready-made passageway for lead wires and other parts. Most standard pins may be furnished pre-slit, if desired, to provide an even, four point overlay. Most metals and finishes are available.

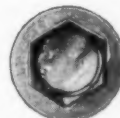
Assembly and Fastener Engineering



Take a cost-wise look at your assembly operations,



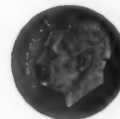
and you'll see that fasteners



represent real money. To make sure



it is money saved—not lost—



count on *Continental*

MORE TYPES OF FASTENERS Continental Assembly Specialists are unbiased toward any particular types . . . Continental makes all types. The fastener they recommend for your job is the one proved best by careful cost analysis.

MORE STANDARDS IN STOCK Continental can supply any recognized standard type, style or size. Also, many fasteners ordinarily considered "specials" are available among the millions of screws constantly in stock to meet needs of Continental customers.

MORE "SPECIAL" EXPERIENCE Continental is known throughout industry as the "specialist in specials," — leads in production of special designs. Continental is also your supply

source for special-purpose fasteners, such as HOLTITE NYLOK Self-locking Screws.

MORE "SPECIAL" PRODUCTION FACILITIES With Continental's modern, precision controlled equipment, many special shaped screws formerly machined from bar stock can be produced faster, at lower cost — with higher tensile strength and excellent surface quality.

Let Continental Assembly Specialists analyze your operations and help you find cost-saving opportunities that are often overlooked. You'll see why fastener users everywhere agree, "You can count on Continental." Write or phone: Continental Screw Co., 448 Mt. Pleasant St., New Bedford, Massachusetts.

CONTINENTAL

SCREW COMPANY, NEW BEDFORD, MASS.

HOLTITE FASTENERS

HY-PRO TOOL COMPANY . . . DIVISION
RESEARCH ENG. & MFG., INC. SUBSIDIARY



HOLTITE PHILLIPS
AND SLOTTED HEAD
WOOD • MACHINE • TAPPING
THREAD FORMING •
SEMS • NYLOK
HY-PRO PHILLIPS
INSERT BITS AND HOLDERS

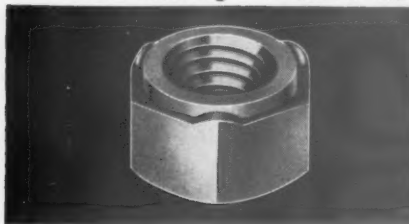
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Use These

GRIPCO NUTS

FOR "FIXED" and "BLIND" fastening to get

★ Easier Positioning ★ Quicker Fastening ★ Positive attaching ★ Less cost

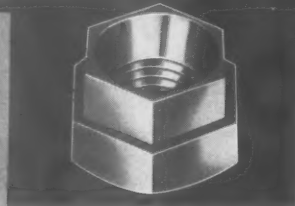


GRIPCO PILOT-PROJECTION WELD NUT

The centering pilot provides quick, easy positioning of nut in pre-punched hole for instant resistance welding. No jigs, no fumbling, no waste of time. No fouling of threads. In two pilot and projection heights with or without the Gripco Locking feature. Sizes No. 6 thru $\frac{3}{8}$ ".

GRIPCO COUNTERSUNK WELD NUT

Countersunk feature eliminates time-wasting re-tapping of nut after welding. The 3 weld projections on both type nuts provide a firm non-rocking electrical connection.



GRIPCO CLINCH NUTS

With or without Gripco locking feature, for positive attaching of a threaded medium to thin metals. Can be automatically fed and clinched or staked with hydraulic or air equipment.

Write for this new FREE catalog today. Ask for samples.

Typical Applications



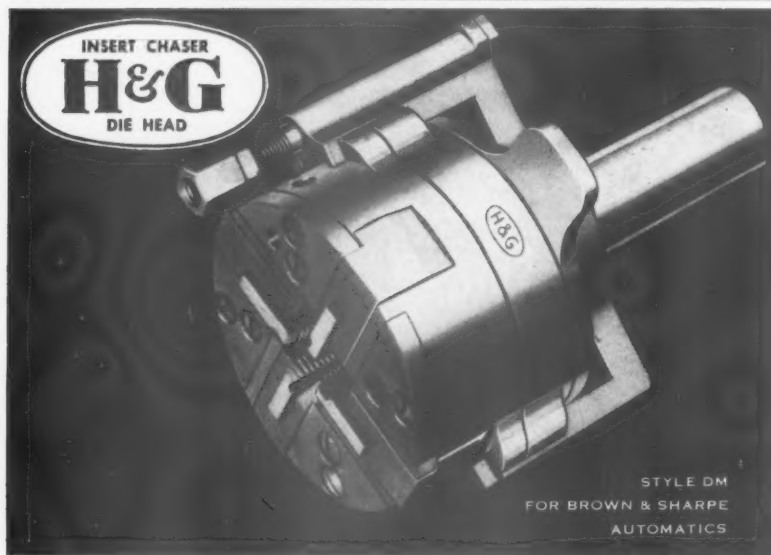
ALL GRIPCO FASTENERS AVAILABLE FOR IMMEDIATE DELIVERY

GRIP NUT COMPANY

113 Maple Ave. • South Whitley, Ind.

Use postpaid card. Circle No. 240

Ad No. 122



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

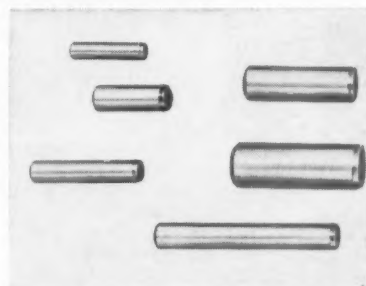
Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$50 you get a dozen of $\frac{1}{4}$ "-16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut; even to Class 3 specifications, with a minimum of downtime. FREE: "Unified and American Screw Thread Digest"

THE EASTERN MACHINE SCREW CORPORATION 20-40 Barclay St., New Haven, Conn.

Use postpaid card. Circle No. 241

Auto-Swage Products, Inc., 69
Wooster St., Shelton, Conn.
Use postpaid card. Circle No. 34

DOWEL PIN LINE IN SIZES 1/8" TO 1"



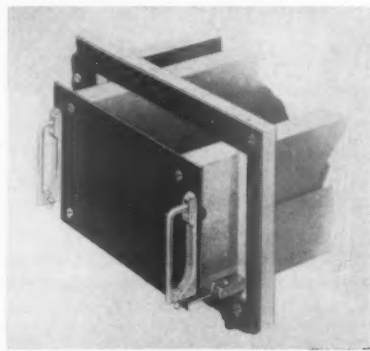
A line of dowel pins for the machine tool and die industry ranges in sizes from $\frac{1}{8}$ " to 1".

The heat treated alloy steel dowel pins are said to have a surface hardness of 60-64 Rockwell, with a micro-inch finish of 8 RMS maximum to assure accurate positioning to close tolerances. Standard Blue Devil pins are ground .0002" over listed diameter for press fit between mating parts, with "oversize" pins ground .001" over listed diameters for repair work. (Tolerances are plus-or-minus .0001".)

Safety Socket Screw Co., 6501 North
Avondale Ave., Chicago 31, Ill.

Use postpaid card. Circle No. 35

CHASSIS LATCH FEATURES PUSH BUTTON RELEASE



An improved chassis latch has been added to a line of latches for use in engaging, disengaging and carrying equipment-filled drawers such as are utilized in electronic racks.

The 35L latch features a push-button release mechanism on the locking device which permits simplified, quick, mechanical release of multiple pin connectors commonly used with plug-in chassis. When returned to the locked position, the latch becomes a sturdy carrying handle. Adequate mechanical advantage is provided to engage connector plugs with forces as high as 400 lbs. without the danger of deforming structures, as may be the case with threaded devices.

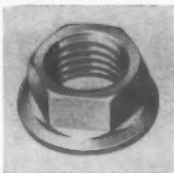
Camloc Fastener Corp., 14 Spring
Valley Road, Paramus, N.J.

Use postpaid card. Circle No. 36

Assembly and Fastener Engineering

SELF-LOCKING HEX NUT FOR HIGH-TEMP. SERVICE

Weight savings, more versatility and standardization possibilities are claimed for a series of all-metal, self-locking hexagon nuts.



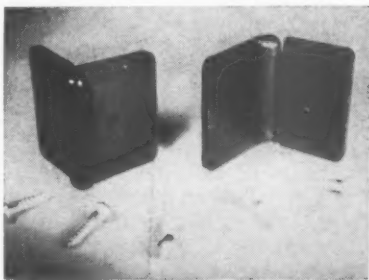
Capable of being used with short-threaded bolt series (NAS1103 or NAS-1503), the Flyweight series is a reduction by two in hexagon size permitting the use of smaller wrenches and narrower bolting flanges. It is said to replace up to 19 assorted hex nuts.

Number T99S low beam is made from chrome-moly vanadium alloy steel, with nickel cadmium diffused plating for 160,000 psi at 550° F., 90,000 psi at 900° F. T99C is available for low magnetic permeability requirements. A second high-beam series comes in reduced hexagon configuration.

Boots Aircraft Nut Corp., Norwalk, Connecticut.

Use postpaid card. Circle No. 37

NON-SQUEAK NYLON HINGE WITH MANY JOINING USES



Many fastening uses are claimed for a silent, non-sticking all-nylon plastic hinge.

Of virtually one-piece design, the mating halves are molded together. No assembly operations are required other than fixing the hinge to the mating section.

The hinge is particularly designed for use in temperature extreme applications, where corrosive chemicals are present, where no lubrication is possible and where long wear is desired.

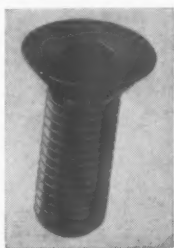
American Plastics Corp., 342 Madison Ave., New York 17, N.Y.

Use postpaid card. Circle No. 38

DEEPER SOCKETS FOR FLAT HEAD CAP SCREWS

Deeper sockets, with the hex running all the way to the bottom of the socket, are reported for a flat head socket cap screw.

The cold forged fasteners are claimed to be free of chips. Sides of head come to a sharp, even edge at the top with a uniform taper.



ROOFING

and SIDING FASTENERS

The TOPSEAL System of Structural Fastening*

combines Engineering Assistance

with the highest quality fasteners ;

Power and Hand Tools; drill bits ;

special design sheeters sockets ; and solid

or "flexible flange" closure—all ready for

immediate shipment. TOPSEAL* Fasteners

arrive on the job with WEATH-R-SEAL®

Washers assembled. Only genuine WEATH-R-SEAL®

Washers have the metal and

neoprene composition bonded together

making a one-piece washer. So—when the

fastener is driven, the sealing portion stays

where it belongs—evenly distributed at

the danger point where leaks must

not occur. The "deflectible lip" of the

neoprene composition (at inner ID) is directed

into the hole sealing the fastener shank.

TOPSEALS installed from the Weatherside

eliminate straps, clips, and various

bolts and nuts. Installation is as easy as

. For new construction or maintenance—

"There's Only ONE TOPSEAL"



Fastening Detail Manual on request

FABRICATED PRODUCTS CO. WEST NEWTON, PA.

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**Take a
close look
at precision...**

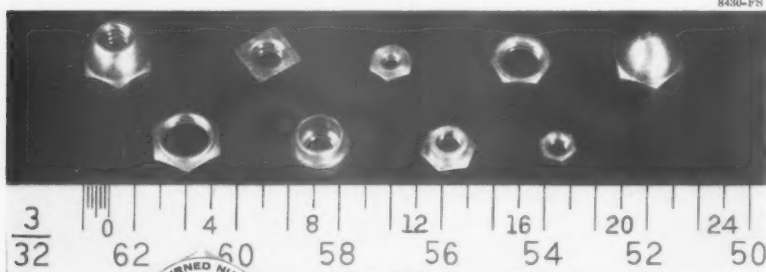


in

MINIATURE!

This is a brass "jewel" nut. A .100-100 shoulder nut used in precision electrical instruments, it is mass produced by **FISCHER** to Class 3 tolerances, countersunk both sides and supplied deburred, cleaned, ready to install.

FISCHER specializes in turned nuts... standards, specials, odd sizes and types... having diameters from $\frac{1}{16}$ " and standard or special threads from No. "0". Each type is made to exacting specifications, delivered promptly, priced competitively. *And these are the reasons **FISCHER** is your best source for dependable miniature nuts.*



there's no
premium
for precision at

Fischer
FISCHER SPECIAL MFG. CO.
496 MORGAN STREET
CINCINNATI 6, OHIO



This enlarged scale photograph illustrates typical miniature nuts being supplied for electrical and electronic products.

For details and
specifications
on Fischer brass
and aluminum nuts,
write for **CATALOG**
FS-1000 and prices.



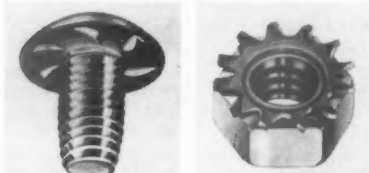
Use postpaid card. Circle No. 243

Brighton Screw and Mfg. Co., 1841
Reading Rd., Cincinnati, Ohio.
Use postpaid card. Circle No. 39

SCREW FOR FIBERGLASS, ALUMINUM, STEEL

The attachment of fiberglass-reinforced plastic seats to chair frames, school desk frames, auditorium seats, etc. has been greatly simplified by a rivet-headed screw designed specifically for use in fiberglass materials.

Only finger pressure is required to retain the Nibscrew while a Keps (pre-assembled nut and lock washer) is



tightened onto the screw from beneath. A large clearance hole can be used, overcoming alignment problems.

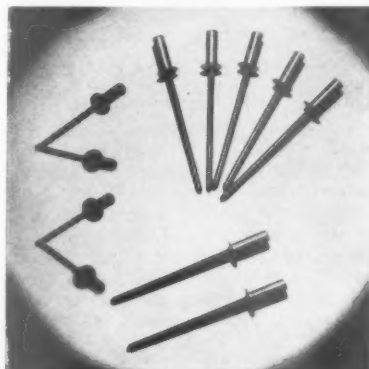
"Nibs" under the head keep the screws from turning, but do not cause cracking and chipping of the fiberglass. No bosses or square holes are required. This screw can also be used effectively in unhardened steel, aluminum, wood.

The smooth head of the screw will not snag or tear clothing, and is tamper-proof. The fastener can be assembled and disassembled easily, permitting economical knocked-down shipments.

Shakeproof Div., Illinois Tool Works, St. Charles Rd., Elgin, Ill.

Use postpaid card. Circle No. 40

BLIND RIVET PROVIDES PRESSURE TIGHTNESS



Air and water-tight at pressures up to 500 psi, the Imex blind rivet is set by pulling a mandrel into the rivet shank, spreading and setting it. Radial expansion of the shank is balanced with shear strength criteria to ensure vibration resistance.

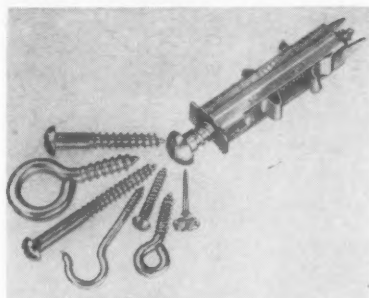
Sealing is automatically obtained by the rivet design: the head of the mandrel is encased within the rivet and seats tightly against a shoulder formed during the setting operation.

The rivet is made in .125" and .187" diameters in aluminum in both short-break and long-break mandrels.

Pop Rivet Div., United Shoe Machinery Corp., West Medway, Mass.

Use postpaid card. Circle No. 41

SCREW ANCHOR FOR WALL FASTENING



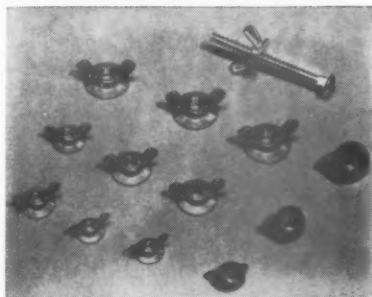
A screw anchor for wall fastening features one-step installation and will accept screw sizes from $\frac{1}{8}$ " to $\frac{1}{4}$ " diameter and 1" or longer.

The Fitsall is installed by drilling a hole through material and tapping anchor in until shoulders rest on the wall. Article to be attached to wall is placed over it and screw inserted. A triple clinching and expansion action claimed.

Fitsall Distributors Inc., 473 S. Franklin St., Hempstead, N.Y.

Use postpaid card. Circle No. 42

WASHER BASE WING NUT EXTENDED TO FULL LINE



A full line of washer-base wing nuts ranges from $\frac{1}{2}$ " to $\frac{3}{8}$ " diameters and thread sizes from 6-32 to $\frac{3}{8}$ -16.

The sturdy zinc alloy parts are tapped in a wide variety of threads to meet diverse needs. The corrosion resistant alloy can be plated in brass, gilt, bright nickel, or oxidized finishes where decorative considerations are important.

The integral washer of the wing nuts provides a broad bearing base so that they may also be used with soft structural materials. In addition, the washer covers large or off-center holes to give a finished appearance. This added bearing surface is also helpful where adjustable assemblies require wide slots for the bolt.

Recessed design of the wings makes the nut easy to grip. Dimensions of the integral washer correspond to the optimum size of washer that would normally be applied with an ordinary wing nut of corresponding size. There are no sharp edges—even the bore of the nut is counter-bored.

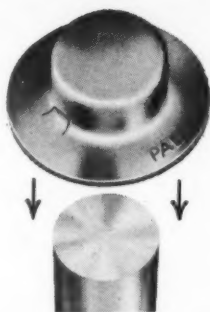
Gries Reproducer Corp., New Rochelle, New York.

Use postpaid card. Circle No. 43

Get
**STRONG, NEAT
ASSEMBLIES**
without threading,
notching or drilling
for cotter pins

Use plain, unthreaded rods,
shafts, studs, rivets or pins
and simply Push on
these low-cost

PUSHNUT® FASTENERS



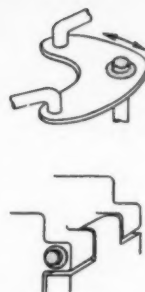
Type W PUSHNUTS

One-piece, heavy gauge spring steel with powerful gripping action. Cover rod ends with smooth, rugged cap. Always align perfectly. Hold tight seated or unseated. Various designs and finishes in sizes for $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " dia. unthreaded rod, wire and studs.

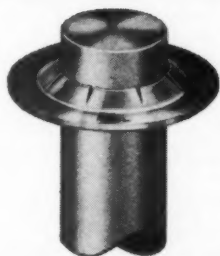


Type U PUSHNUT Retainers

New low-cost, space-saving spring steel retainers push on plain rod or axle, providing strong, firm retention of parts, seated or unseated. Eliminate notching, grooving, drilling and cotter pins. Available for $\frac{1}{16}$ " and $\frac{3}{16}$ " dia. rod; other sizes in development.

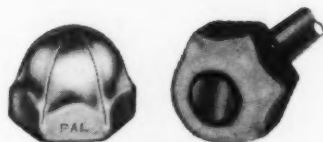


All PUSHNUTS apply manually or with high speed air hammers



Flat Type H PUSHNUTS

Easily, quickly pushed on unthreaded studs to assure tight, vibration-proof assembly of ornaments, medallions, nameplates and other parts. Grip tight on hard chrome studs. Sizes for $\frac{1}{16}$ ", $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{5}{16}$ " dia. studs.



Acorn Type PUSHNUTS

Pleasing, decorative appearance and strong spring grip for fastening or covering ends of rods, studs or rivets. Open end and closed end types. Six sizes from .120" to .312" dia.

THE PALNUT COMPANY, 79 Glen Road, Mountainside, N. J.
In Canada: P. L. Robertson Co., Ltd., Milton, Ont.

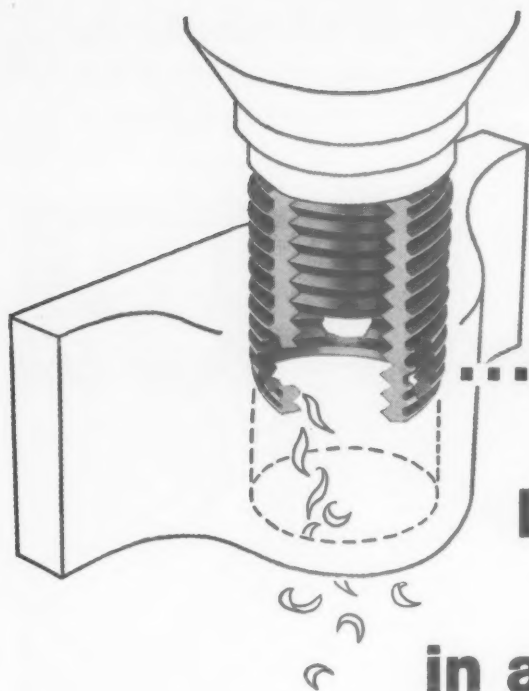
PALNUT®

**LOCK NUTS
FASTENERS**



Quick, secure fastening at low cost

Use postpaid card. Circle No. 244



The TAP-LOK[®] threaded insert

...taps its own thread

locks itself in...

in a
single operation!



TAP-LOK inserts provide strong wear-resistant threads in relatively soft machinable materials (wood, plastic, aluminum, etc.) . . . as well as in *harder* materials where repeated assembly makes excessive thread wear a problem.

Unlike ordinary threaded inserts, however, TAP-LOK inserts cut their own threads in the parent material. Thus, *no additional assembly time is required* with a TAP-LOK insert.

Its installed cost is the lowest of any threaded insert.

The locking action is achieved in this way: the tapered pilot section carrying the thread cutting edges is followed by the full diameter threads which force their way into the parent material. Once installed, a TAP-LOK insert is permanently locked in place.

Available in the types shown below, TAP-LOK inserts can be used wherever threaded inserts are required. Write today for complete information.



Slotted:—Full V-form external threads provide maximum locking torque; permit wide choice of mating hole sizes. Recommended for soft aluminum, zinc die castings, sand castings, plastics, Class 2B internal thread — MIL-MS 35914.



H-Series:—A heavy walled insert with truncated root external thread and three-hole cutting edges for hard-to-tap higher-strength materials and to meet MIL and other specs calling for Class 3B thread fit for gaging after installation.



W-Series:—Coarse-pitch external thread offers maximum strength; permits installation in small wooden sections without splitting. For furniture, cabinets and other wooden parts where strong, permanent threads are required.



P-Series:—This Tap-Lok insert was designed to eliminate thread wear and renew damaged threads in spark plug sockets in aluminum cylinder heads. It is available from stock for standard plug sizes to meet most needs.

TAP-LOK



Another fastener development from—
GROOV-PIN CORPORATION
1135 Hendricks Causeway, Ridgefield, N. J.

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 68.

ELECTRONICS ASSEMBLY

Production equipment for electronics assembly is featured in a 12-page, two-color bulletin. A Dynasert line provides a machine to insert each component, either automatically or semi-automatically. Photographs and text treat the subject of mechanized assembly; especially applicable for printed circuit production. Industrial Sales Div., United Shoe Machinery Corp., 140 Federal St., Boston, Massachusetts.

Use postpaid card. Circle No. 50

PLATEN CONVEYOR

For assembly, inspection, integrated machining or processing, a platen conveyor—presented in four-page brochure—offers a self-contained production line. The carousel and over & under models are pictured and described. A typical setup is illustrated. Visi-Trol Engineering Co., 9345 Hubbell, Detroit 28, Michigan.

Use postpaid card. Circle No. 51

FLASH-BUTT WELDING

Valuable instruction in the tooling necessary for flash-butt welding is offered in 16-page Bulletin 7-913. The process is explained in text, followed by a photographic sequence of the clamping, flash and upset mechanisms on various machines. Finally, 20 applications—each pictured with the applicable machine—are described by product, material and production rate. The Taylor-Winfield Corp., Warren, Ohio. William St., Buffalo 6, N.Y.

Use postpaid card. Circle No. 52

FIBRE INSERT-TYPE NUT

Self-locking nuts used to retain anti-friction precision bearings on spindles and shafts are described in 4-page two-color brochure. The Bearhug Locknut is a single unit which incorporates a locking fibre insert in its design. Design features, performance, materials and construction and dimensional specifications are presented. Photographs

illustrate use. Bearing Locknut & Machine Co., Irvington, N.J.

Use postpaid card. Circle No. 53

LIGHTWEIGHT LOCKNUTS

Cold-forged locknuts permitting weight savings to 72% are the subject of 4-page bulletin. Tensile strength of the nuts is more than 125,000 lbs. psi. Tables compare weights of the FN-12 with other locknuts, in current sizes from No. 4-40 to $\frac{1}{8}$ -24. Diagrams illustrate installation methods, graphs of torque versus induced load and tension-tension fatigue test results included. Standard Pressed Steel, Jenkintown, Pa.

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ELECTRIC DRIVERS

Electric power screwdrivers and accessories are pictured and specified as part of 30-page Catalog 589 on all types of portable power tools. Capacities, speeds and physical characteristics are listed for six models. Sockets, bits and an extension are described. Price list attached. Stanley Electric Tools, 111 Elm St., New Britain, Conn.

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ALUMINUM STUD CAP

Photos illustrating the installation sequence of an aluminum stud cap highlights a one-page flyer (Form 8-437). A companion sheet (8-437A) gives test report data, describing a pull-off test in which the threadless, drive-on type fastener resisted pull-off forces. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Michigan.

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OVERHEAD CONVEYORS

Overhead conveyor systems are fully treated in a 12-page handbook. Every point is well illustrated. Features and components are explained by text and photographs; diagrams and photos illustrate typical layouts and various types of plant installations shown. A



(See 53)



(See 50)



(See 51)

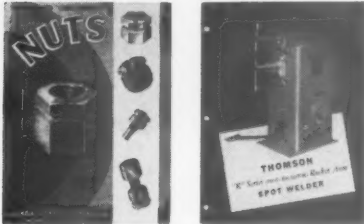
list of users is given. Chainveyor Corp., 5618 E. Washington Blvd., Los Angeles 22, California.

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SELF-RETAINING NUTS

One-piece lock nuts made for general use are described in a four-page brochure and insert. Made from steel milled from bar, the nut is furnished in the same dimensions as any standard hex nut. Columbia Nut & Bolt Co., Inc., 945 Main St., Bridgeport, Conn.

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ROCKER ARM SPOT WELDER

A series of rocker arm spot welders—foot, air or motor—is specified in an eight-page bulletin. Machine features are pictured, with tables of capacities, cable sizes and power requirements, model specifications and special tooling. Eight typical applications are described and illustrated. Thomson Electric Welder Co., 161 Pleasant St., Lynn, Massachusetts.

Use postpaid card. Circle No. 59

PUSH-ON FASTENERS

Fasteners for use on unthreaded studs are described on a two-page flyer. Pushnut dimensions, features, installation and appearance are presented. Samples. The Palnut Co., Glen Rd., Mountainside, N.J.

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SPLIT-GAUGE WALL CHART

A unique split-gauge wall size (21" x 36") wire chart tabulates steel wire gauge sizes from 7/0 to 41 according to the Washburn and Moen scale, giving both full gauges and split sizes in 1/4 steps. Opposite each is listed the decimal size of the wire. Mettler Machine Tool, Inc. Adeline St., New Haven 4, Conn.

Use postpaid card. Circle No. 61

PLASTIC CEMENT

Plasgon, an adhesive plastic cement, is used to seal joints, make gaskets and perform variety of industrial tasks. The sandwich application technique is described, with prices and shipping weights, in two-page data sheet. Samuel Cabot, Inc., 141 Milk St., Boston 9, Mass.

Use postpaid card. Circle No. 62

ARCULATE STITCHING

An expert in wire stitching, John H. Prout, answers typical questions about arcuate stitching, a major improvement in method. The 10-page booklet describes this technique in which an arc is put in a cross-section of flat wire

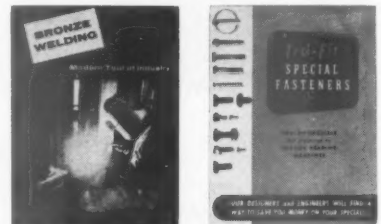
as it runs through a stitching machine. Acme Steel Co., 135th St. & Perry Ave., Chicago 27, Ill.

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BRONZE WELDING ALLOYS

Bronze welding alloy rods for gas and arc welding applications are described in a four-page folder. The characteristics of various silicon, low fuming nickel, manganese, bronzes and nickel silver are discussed. A table lists melting points and round rod weights for standard alloys. Bridgeport Brass Co., Bridgeport 2, Conn.

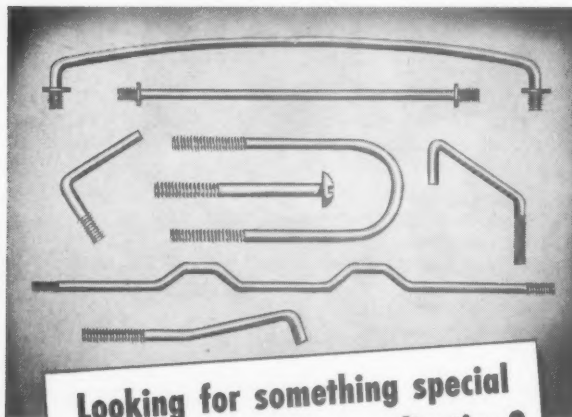
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SPECIAL FASTENERS

Case histories of special fastener designing and presentation of heading equipment facilities high-light an eight-page, two-color brochure. Manufacturing techniques are outlined and photos of 42 types of specials made are captioned. Tru-Fit Screw Products Corp., 1300 Athens Ave., Cleveland 7, Ohio.

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Assembly and Fastener Engineering

HONEYCOMB BRAZING SHEET

A single-page engineering data sheet (4-A) discusses a .005" thick flexible Microbraz brazing sheet for high temperature service honeycomb applications. Sizes and weights as well as wetting and flow properties are covered. Stainless Processing Div., Wall Colmonoy Corp., 19345 John R St., Detroit 3, Michigan.

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RIVET-NUT APPLICATION

How a one-piece combination tubular rivet and nut may be used to simplify design and assembly where attachments or fastenings are involved is told in a new catalog. Sectional drawings of assembled products illustrate the text. The riveting machines which automatically feed and set Perma-Nuts are covered. Tubular Rivet & Stud Co., Quincy 70, Massachusetts.

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IMPACT WRENCH KITS

Two mechanics maintenance tool kits, contain 1/2" square-drive impact wrenches, one electric and one air powered, and accessories. Four-page brochure CI2558 points out uses, examines a typical maintenance job, describes the action of the impact wrench and lists the contents of each kit. Remington Arms Co., Inc., 939 Barnum Ave., Bridgeport 2, Conn.

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MAGNETIC SOCKETS

A line of magnetic sockets designed to eliminate hard starting of fasteners during assembly is presented in a four-page guide. The sockets will hold cap screws or nuts in position while the nut is being started and tightened. Specifications for 14 types are given. Cornwell Tool Co., 4548 Milwaukee Ave., Chicago 30, Illinois.

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ALL-PURPOSE STEEL BAR

"How to Make Your Own Machine and Repair Parts Quicker and Easier," is a 24-page booklet describing the various uses of Stressproof, an all-purpose steel bar. Included are sections which recommend welding rods by brand and company and a list of drill-hole tolerances. La Salle Steel Co., Box 6800-A, Chicago 80, Ill.

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WELDING EQUIPMENT SURVEY

Fifty important design features found in oxy-acetylene welding and cutting equipment are evaluated in a 24-page brochure, illustrated with cross-sectional drawings. Half of the booklet

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with the M•F line of lock nuts
and weld nuts in all sizes*

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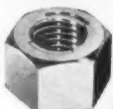
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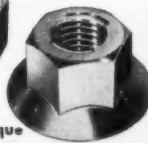
Open cap nut
with 2 way
locking feature



M•F UNI-TORQUE® LOCK NUT



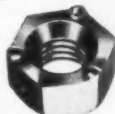
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with uni-torque
locking feature



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Recessed
type



M•F SPIN LOCK NUT



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This all-metal, double chamfered, re-usable prevailing torque lock nut can be applied to bolt threads from either end. The center locking principle permits bolt end to be flush with top of nut. Can be re-applied up to 10 times.

**for high torque consistency
in full and jam thickness**

This prevailing-torque lock nut will withstand terrific vibration and shock loading; retains its locking ability for as many as 10 RE-applications. This is the lock nut that enables you to predict—and maintain—UNIFORM bolt tension.

for low-cost assembly

Solve production delays, cut manufacturing costs—fuse nut to the product in exact location. Engineered for assembly simplification. The welding of nuts to sub-assemblies permits the use of screws or bolts in the main assembly without the need for holding nuts from turning, cutting time and labor.

Both types available with the patented M•F Two-Way locking feature. Each type has three welding projections, eliminating rock and guaranteeing a uniform weld.

**the nut with the built-in
lockwasher**

This free-spinning one-piece lock nut eliminates the need for supplemental locking devices such as lockwashers. Cuts purchasing and inventory costs.

WRITE FOR FREE CATALOG

The M•F Products Catalog—valuable data on torque, bolt tension and dimensions as well as on other available products.



MAC LEAN-FOGG Lock Nut Company

5535 N. WOLCOTT STREET • CHICAGO 40, ILLINOIS

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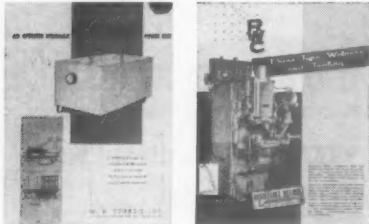
will be of special interest to welding and plant maintenance supervisors and half to those dealing with pneumatic regulators. Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.

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HYDRAULIC POWER UNIT

A portable, compact power unit is air-operated and powers all types of hydraulic components. The Pack-Horse is described in four-page brochure with cutaway photograph, graph of operating characteristics, specifications and text. M. B. Sturgis Inc., 601 S. Taylor Ave., St. Louis 10, Missouri.

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PRESS TYPE WELDERS

Quick-reference Bulletin PTW5701 pictures 15 press type welders for general purpose spot and projection welding. Each photo is accompanied by a descriptive paragraph and drawing showing one typical application. Resistance Welder Corp., Bay City, Mich.

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ASSEMBLY SEALANT

New techniques for retaining anti-friction bearings with Loctite sealant are related in a brochure. Also described are methods of sealing joints against high fluid pressures without mixing or causing pot life problems and of eliminating loose nuts and bolts. The thin liquid plastic hardens without shrinking. Sample. American Sealants Co., 135 Woodbine St., Hartford 6, Conn.

Use postpaid card. Circle No. 74

STANDARD CLINCH NUTS

Three types of standard clinch nuts are completely specified on a one-page engineering sheet. Dimensional drawings supplement data on size, materials, finishes. Specials are also specified. Ace Screw Products Co., 212 E. Washington Ave., Jackson, Mich.

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LOCKNUTS, LOCKWASHERS

Price changes are announced for SAE ball and roller bearing locknuts and lockwashers in a one-page form. Prices remain unchanged for 8-slot, heavy duty, left-hand, thin, precision locknuts and ground lockwashers. Whittet-Higgins Co., Box 1613, Providence 1, R.I.

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FREE RUNNING LOCK NUT

Characteristics, action and standard specifications of free running, one-piece lock nut presented in easy-to-read, four-page brochure. The self-energizing fastener is designed for protecting bolts, studs and axle shafts. Klincher Locknut

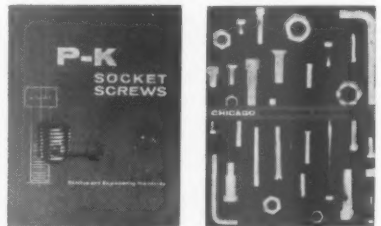
Corp., 2153 Hillside Ave., Indianapolis, Indiana.

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SOCKET HEAD SCREWS

Socket head screws are attractively presented in 28-page Form 490C. Cap screws, flat heads, button heads, set screws, shoulder screws, pipe plugs and hex keys are specified. It contains the revised dimensions approved by the Socket Head Cap and Set Screw Manufacturer's Standards Committee. Parker-Kalon Div., General American Transportation Corp., Clifton, N.J.

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STANDARD FASTENERS

A complete line of standard fasteners is treated in attractive gate-folded six-page brochure. A strengthening process of "carbon restoration" goes into the manufacturing of socket screws, cap screws, nuts, pins, set screws and studs. Photographs reveal facilities. Chicago Screw Co., Div. of Standard Screw Co., 2500 Washington Blvd., Bellwood, Illinois.

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BE SURE ABOUT YOUR FASTENERS!

... use the right one ... with the right holding power
... delivered right on time ... at the right price

Speed up your assembly work, eliminate alignment problems, cut your production costs with McLaughlin pre-engineered nuts and bolts that give you positive holding action.

Complete stocks, close liaison, assure you of the quantities you need at the right time and the right price.

Specials—including aluminum and stainless—for every fastening application.

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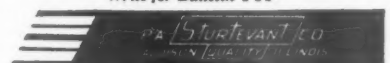
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**DESIGNERS
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in assembly.**

Capacities:
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APRIL, 1959

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assembly and fastener engineering

APRIL, 1959

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EDITORIAL ITEMS

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WASHER-BASE CAP NUTS

Standard specification sheets cover two types of die cast cap nuts—washer base cap nuts with closed ends and open washer base cap nuts. Details on blank sizes, thread sizes, principal dimensions and shipping weights are given. Gries Reproducer Corp., 400 Beechwood Ave., New Rochelle, N.Y.

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STANDARD SCREWS, BOLTS

Net price sheets, made to save time in calculating discounts, are included in 14-page catalog for screw and bolt distributors. Majestic Screw & Bolt Co., 1042 W. 11th St., Chicago 7, Ill.

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NUTS

An eight-page condensus of a 144-page catalog is designed to cover in brief the basic engineering data and specifications of nuts: hexagon, $\frac{1}{4}$ " to 3"; pointer, $\frac{1}{4}$ " to $\frac{5}{8}$ "; "Conelok, Huglok, Marsden" locknuts, $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Accompanying 24-page engineering data section available on request. National Machine Products Co., Utica, Mich.

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RIVETS, STAPLES, WASHERS

A two-color 24 page catalog presents the Plymouth line of standard fasteners: rivets, burrs, tacks, staples, washers. Each product is illustrated with complete ordering information: specifications, weights per 1000. The plant's cold-heading facilities are pictured. Cobb & Drew, Inc., Plymouth, Mass.

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BLIND FASTENER

Applications of the Jack Nut, designed for fastening fixtures to hollow construction where expansion space may be as little as $\frac{3}{8}$ ", are outlined in a four-page, pocket-sized folder. Typical uses are illustrated, specifications listed and the five-step installation process pictured. Molly Corp., Reading, Pa.

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Young in years—mature in outlook. College grad—technical background. Will consider general management of smaller company.

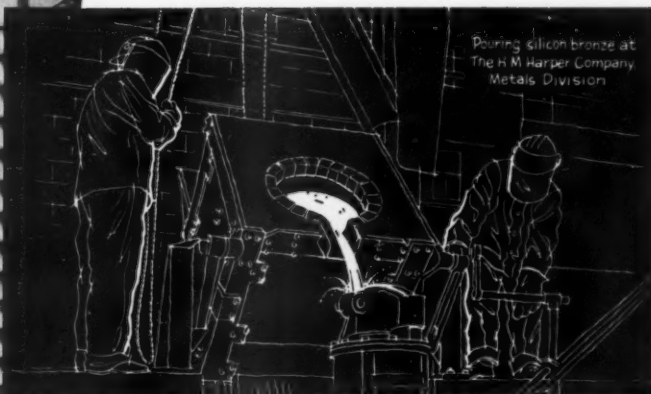
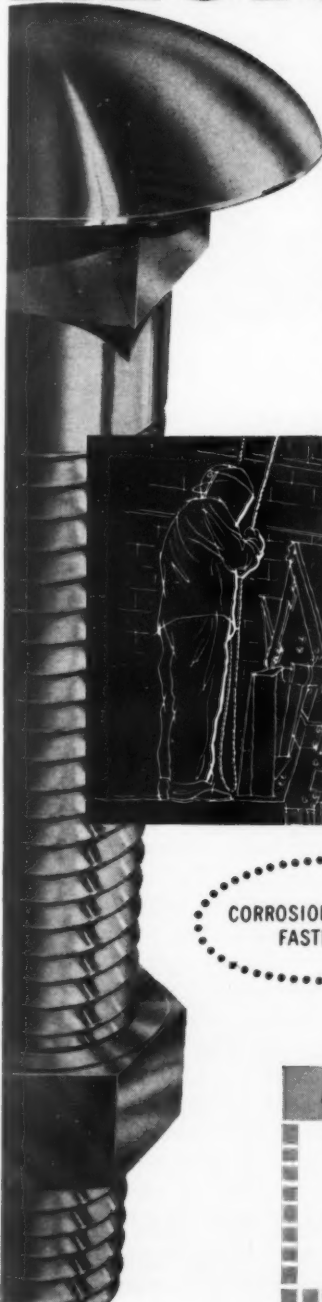
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Whatever your corrosion problem, Harper has the corrosion-resistant fastening to answer your need. Stainless Steels, Monel, Silicon Bronze, Naval Bronze, Brass, Copper, Aluminum, Titanium are standard metals at Harper. In fact, during the past 35 years, Harper has manufactured over 100 different corrosion-resistant alloys into HARPER EVERLASTING FASTENINGS. Millions of standard and non-standard items are carried in stock by Harper and Harper Distributors. See how Harper corrosion-resistance can help you. Write for the facts.



CORROSION-RESISTANT FASTENINGS



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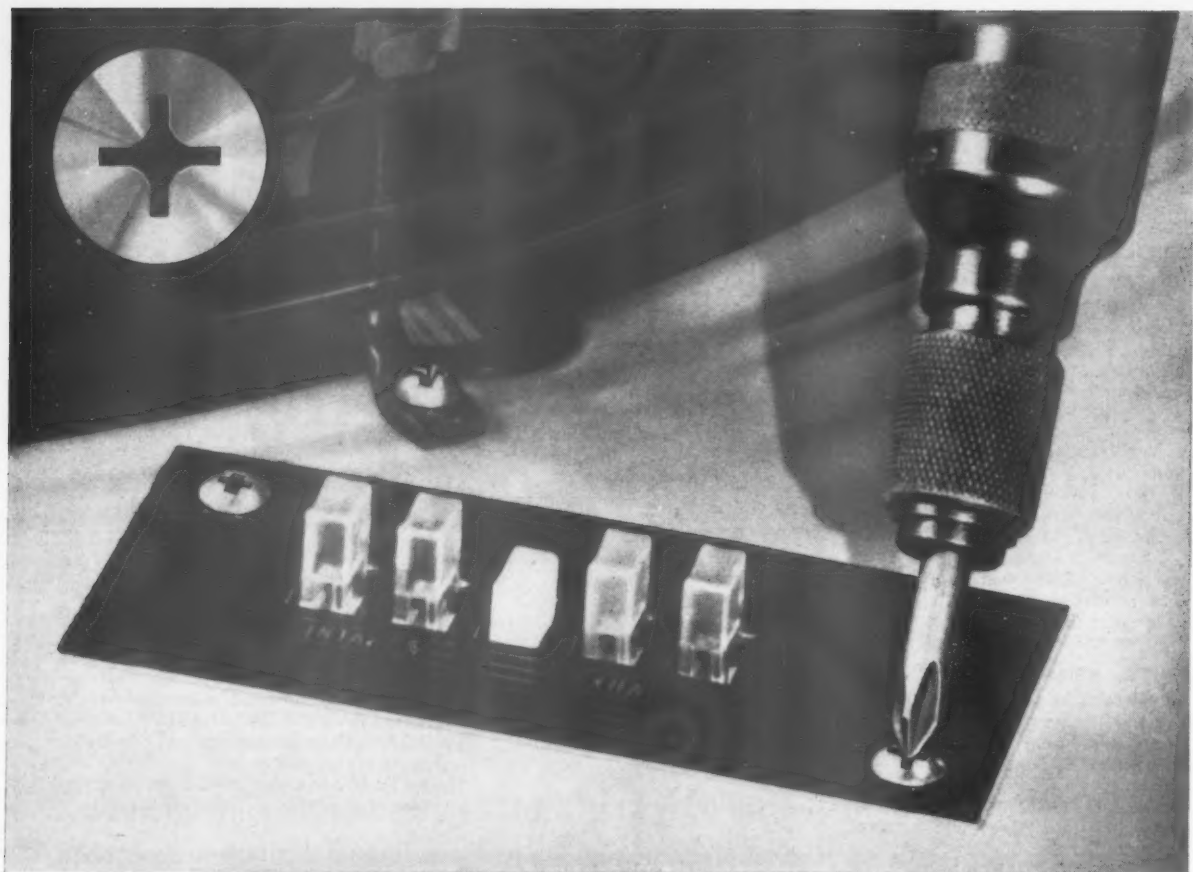
H. M. HARPER COMPANY

8204 Lehigh Avenue • Morton Grove, Illinois

Gentlemen:

Please send me your report on "Corrosion Resistance" at no cost or obligation.

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PHILLIPS SCREWS...the fastener with a plus!

Continuing Product Improvement (A few more of the design changes in Phillips screws)

- Introduction of #0 Phillips recess sizes to cover miniature screws and #5 recess to cover $\frac{5}{8}$ " and $\frac{3}{4}$ " diameter screw sizes.
- Decrease of nose angle on Phillips driver from 28° to 18°, to prevent driver interference at its tip, improves fit and quality.
- The establishment of improved wing clearance between surfaces of recess and driver bit to favor best driveability.

improve appearance, permit design freedom

If product appearance is an important consideration to you, as it is in the design and assembly of most products, compare Phillips cross-recessed-head design with other types of fasteners.

With Phillips screws, because of the perfect alignment of the cross recess and driver, there's no danger of the driver slipping and marring surfaces... even with power drivers. Also there's no unsightly burring or splitting of screw heads.

There is no difficulty in driving Phillips screws in awkward positions. They may be located wherever design and appearance considerations dictate.

Improved appearance is only one reason for specifying high quality Phillips cross-recessed-head screws. Their ability to speed production, reduce costs and provide greater holding power accounts for the widespread usage of Phillips screws by so many manufacturers in every major industry.

Constant product improvements (see box) also benefits you. Phillips famed cross-recess is made in every type of head configuration to a universal standard by leading fastener producers in every section of the country. On your fastening jobs, specify Phillips screws.

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SCREW RESEARCH ASSOCIATION

PHILLIPS CROSS-RECESSED-HEAD SCREWS...THE FASTENER WITH A PLUS

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INDUSTRY MAKES NEWS

LIQUID CARBONIC ENGINEERS STUDY WELDING



Liquid Carbonic field engineers study at Chicago seminar. H. C. Wilson uses cutting torch and J. E. Scott makes practice weld under eye of E. J. Vogel.

Field engineers of the General Dynamics Liquid Carbonic Division studied the uses of welding and cutting in a laboratory especially constructed for an engineering seminar on compressed gases, at the company's Chicago plant.

Directed by Edward J. Vogel, technical sales director, the course was held on Feb. 16-17 and was attended by half of Liquid Carbonic's field engineers and salesmen. Subjects covered new applications of liquified gases, physical properties of

gases, technical servicing of welding equipment, functions and design of regulators, industrial piping and compressed gas economies.

GIANT MACHINE CHECKS BOLT FATIGUE

Critical fatigue properties of large-diameter aircraft bolts can be checked and controlled in production, for the first time, with a giant new tension-tension fatigue tester recently put into operation by Standard Pressed Steel Co., Jenkintown, Pa.

It is capable of applying a 132,000 lb. load to a screw 2000 times a minute and is being used for production quality control of fasteners up to 1½" in diameter.

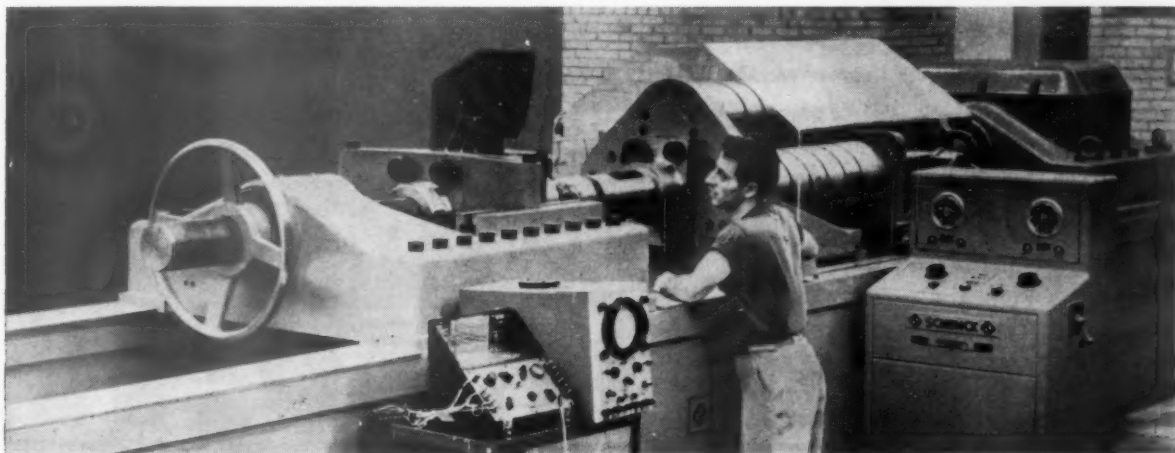
SPS will also use the machine extensively for research into big-bolt behavior and for evaluating fastener materials and designs.

Until now, it has been the practice to submit large bolts to qualification tests only. It has been impossible for a fastener producer to fatigue test each production lot of high-strength bolts of these sizes.

The available 60,000 lb. fatigue machine which was SPS's (and the industry's) biggest unit just didn't have the muscle-power to satisfactorily test the larger bolts to military specifications.

Because of the extreme importance of tensile

continued



fatigue strength in critical structural applications—some 85% of tension bolt failures can be traced to fatigue—the use of large-size threaded fasteners has been seriously handicapped in many areas. Primary uses for the big bolts include airframes, launching platforms for rockets, nuclear equipment and machine tools in areas subject to high stress.

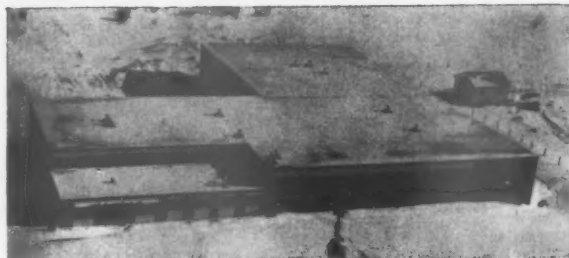
The 26-ton, 25-foot-long machine, made by The Schenck Machine Works, can test to existing military specifications all standard sizes of aircraft tension bolts in series MS 20004 (160,000-psi ultimate tensile strength) and series NAS 624 (180,000 psi). It can also handle the higher strength 220,000 psi super bolts in sizes up to 1 3/8" and even 260,000 psi bolts up to 1 1/2" in diameter.

Static and dynamic loads are applied through four massive springs. The alternating or dynamic force is exerted about 2000 cpm by rotating eccentric masses at the resonant frequency of the system. The accuracy of the load is maintained within $\pm 2\%$ by electronic controls.

PAGE STEEL & WIRE ADDS SALES EXEC.

T. P. Bronco has been appointed to the new position of assistant to the general manager—sales activities according to an announcement made by Joseph N. Kemple, general manager, Page Steel & Wire Division, American Chain & Cable Co., Inc., Monessen, Pa. Formerly assistant product manager of manufacturers' wire, he will make his headquarters at the Monessen, Pa. office.

He is a member of the Pennsylvania Bar.



NEW MANUFACTURING PLANT for the McLaughlin Co. in operation in Petoskey, Mich. The 35,000 sq. ft. facility is being used to produce fasteners.

IAN DANIELS NAMED COLONIAL SALES REP.

Ian Daniels Associates, Merrick, L.I. has been named exclusive sales representatives for Colonial Mfg. Co., Harrison, N.Y.

According to Gerald Appel, sales-manager for Ian Daniels, nationwide distribution for Colonial products has already been accomplished, although several territories are not yet covered in the desired depth. Merritt Advertising, New York City, has been appointed to handle the sales organization account.

PITTSBURGH SCREW REQUESTS NAME CHANGE

The board of directors of the Pittsburgh Screw and Bolt Corp. is planning to ask the stockholders to approve a change of name to Screw and Bolt Corporation of America.

The matter will come up for a vote at the annual meeting on April 15 in the Penn-Sheraton Hotel in Pittsburgh, Pa.

Donn D. Greenshields, president, explained that the 62-year old company has grown from a company doing business on a local basis to one now doing business on a national scale.

YOUR INTRODUCTION TO A SPECIALIST IN STAINLESS STEEL FASTENERS . . .

We, at Allmetal, offer immediate delivery for your Stainless Steel Fastener needs.

Thirty years of "Know How" specializing in the manufacturing of Stainless Steel Fasteners is the best answer to your fastener problems. We are constantly alerted to maintain the type and quality of Stainless Steel Fasteners you require for production. Do not hesitate to inform us as to your full requirements.

Write on your company letterhead for latest catalog. This too, automatically places you on our mailing list.



ALLMETAL

Use postpaid card. Circle No. 252

ASME MEETINGS TO PROBE METALS ENGN.

New developments in metal engineering and related fields will be explored during a three-day conference beginning April 29 at Albany, New York, it was announced by The American Society of Mechanical Engineers. The conference will feature 24 technical papers and a workshop session.

Glenn B. Warren, president of ASME, will speak on "The Challenges of the Mechanical Engineer to the Metallurgical Engineer." Warren is vice president and consulting engineer, turbine division of the General Electric Company.

Arthur W. Weber, vice president of ASME and vice president of the Corning Glass Works, Corning, New York, will deliver a luncheon speech on the subject, "Non-Metallic Structural Materials."

TUBULAR RIVET MARKETING, SALES APPTS.



DOCKENDORFF



Schluter

Daniel W. Schluter has been named to the new office of manager of advertising and market research for the Tubular Rivet and Stud Co., Quincy, Mass. His replacement as eastern district sales manager is Ernest W. Dockendorff.

continued



FULL-SCALE ACCURACY

Whether it's inch grams or inch pounds, Apco Mossberg Torque Screwdrivers respond quickly and precisely throughout their entire range. There are no springs or delicate parts to get out of kilter! Large, white-on-black dial faces simplify readings . . . assure fast, accurate torque measurements on all types of electrical, electronic, or instrument assembly or repair jobs. Available in all sizes from inch-gram to inch-pound readings.

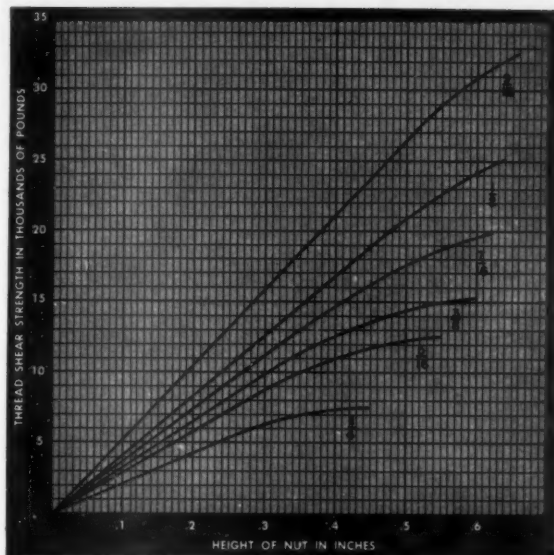


Write for details!



Use postpaid card. Circle No. 253

April, 1959



Shear Strength...

Finished HEXAGON NUTS fine and coarse threads

The above curves show how the proof load of a nut (the load causing the threads to strip) varies with its height. (The curves do not account for bolt characteristics or fatigue and safety factors.)

If you are buying load carrying capacity, the curves suggest that it may be more economical to:

1. Use a thicker nut—
2. Increase the fastener size—
3. Use more and smaller fastenings—
4. Use heat-treated nuts to develop full bolt strength (heat-treating increases nut proof load 30 to 50% over the above values)—

Variables of economical fastener design selection and assembly are discussed in the Engineering Data section of our catalogue that we will send upon request.

*Manufacturer of Standard and Special
*12 Pointer, Square and Hexagon Nuts
... "Huglock" and "Conelock" locknuts.*

NATIONAL MACHINE PRODUCTS COMPANY

an *sps* company 44250 UTICA ROAD
UTICA, MICH



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73

dorff. Schluter had also served as purchasing agent and supervisor of the home sales office before taking eastern district sales in 1957. Dockendorff has been sales correspondent in the home sales office and sales engineer in the N.J., Pa. area.

ASME CONFERENCE SLATED FOR MAY

Four conferences of The American Society of Mechanical Engineers will convene during May: Maintenance & Plant Engineering Div., May 4-5, Edgewater Beach Hotel, Chicago; Production Engineering Div., May 12-14, Statler-Hilton, Detroit; Conference on Automatic Techniques, May 11-13, Chicago; Design Engineering, May 25-28, Convention Hall, Philadelphia.

MARTIN NAMES SANDS TO RESEARCH POST



The Martin Company announced the appointment of Dr. George D. Sands as its scientific "pulse-taker" for the new "age of space."

The 39-year-old physical chemist, formerly chief of the Nuclear Branch of the U. S. Army's Transportation Research and Engineering Command at Fort Eustis, Va., joins Martin's corporate staff as Director of Scientific Requirements.

His mission is to analyze their scientific efforts and goals, both current and future, and translate them into terms of specific requirements for rocket systems, power sources, creative engineering projects and research programs needed for their actual achievement.

DIVISIONAL SALES CHANGES AT AS&W



GOODENOUGH



ASHBAUCHER

The retirement of Clarence T. Gilchrist, 51-year veteran with the American Steel and Wire Division, Cleveland, Ohio, of U.S. Steel, initiated personnel changes in the division. Succeeding Gilchrist as manager of sales-western area is B. M. Ashbacher, for the past year manager of Chicago district sales. Stuart W. Goodenough will fill that vacancy, and his former position as manager of manufacturers products, Chicago district, will be handled by Robert H. Hauger. His assistant will be David P. Phillips.

PEASLEE SPEAKS ON HIGH-TEMP. BRAZING

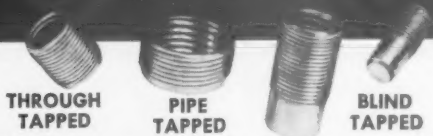
R. L. Peaslee, vice president in charge of Wall Colmonoy Corporation's Stainless Processing Division and a well-known authority on brazing for high temperature service, addressed the American Welding Society during the Western Metal Congress and Exposition in Los Angeles. The talk, was titled, "Thermal Fatigue and High Temperature Brazement."

Peaslee explored the significance of thermal fatigue in

LOK-THRED • LOK-THRED • LOK-THRED

MIN-O-DEE
THREAD INSERTS

(Minimum outside diameter)



TO REPAIR DAMAGED THREADS

Saves expensive castings, easily, economically.
Uses standard drills and drivers.

TO PROTECT INTERNAL THREADS

Prevents wear on soft metal threads. Permits use of inexpensive cap screws. Inserts won't loosen. Easily removed with standard "ease-out" tool without damage to casting.

TO STRENGTHEN ASSEMBLIES

Vibration proof inserts give maximum holding power. Saves expensive casting material. Permits smaller bosses. Grips firmly over entire thread length.

(Send for complete technical details.)

LOCK THREAD CORPORATION, 2832 E. Grand Blvd.,
Detroit 11, Mich.

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**Set
Screw
Users**

Moore offers you a fast, dependable and economical source for one or a million



Moore Set Screws are precision-made and are backed by over 75 years of design-engineering and manufacturing experience. They are of proper hardness for maximum strength and life; they have accurate threads for secure locking action; and they are quality controlled for consistent uniformity. You get fast delivery . . . off the shelf on standard items; two or three-day part shipments on specials.

Improve your product and maintain production schedules with Moore Set Screws. Engineering assistance available.

Moore prices are right . . .
Send for Detailed Price Catalog.

Condensed Specifications

	Headless Slotted	Square Head	Socket Head
Size (dia.)	#0 to 3/4"	#6 to 3/8"	#4 to 3/8"
Lengths	1/16 to 3"	3/16 to 2 1/2"	1/8 to 1"
Points	cup, oval, round, flat, cone, dog		
Materials	steel, brass, bronze, stainless, aluminum, alloy steel, monel		

Special Heads — milled, slotted, double slot, knurled.

Miniature Headless—#0, #1, #2, #3 sizes in a wide selection of metals, finishes, lengths and points.

MOORE
SET SCREWS

George W. Moore, Inc.
since 1880

91 Beaver St., Waltham 54, Mass.

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Assembly and Fastener Engineering

brazed joints for high temperature service, particularly as applied to honeycomb assemblies and other light sheet metal structures.

UPLAND TO EXPAND MANUFACTURING PLANT

Upland Industries, Inc., will construct a 100,000 sq. ft. addition to its manufacturing facilities in Upland, Pa., it was announced by Jon Kuc, president.

To be completed by June 30, the three story reinforced concrete and masonry building will triple the production capacity of the plant, located near Chester, Pa. Kuc said the expansion was necessitated by a 34% increase in sales last year, and an anticipated increase of 20 to 25% in 1959.

EUTECTIC WAREHOUSE OPENS IN SEATTLE

A warehouse-service center to serve the Pacific northwest has been established by the Eutectic Welding Alloys—Northwestern Division, Inc. in Seattle, Wash. The center will be operated by Peter Nuno.

NORRIS NEW DENISON ENGIN. PRESIDENT

Paul W. Norris, vice president and general manager of Denison Engineering Div., American Brake Shoe Co., Columbus, Ohio, has been named president of that division.

Norris, who joined Denison Engineering in 1934, held his prior post since 1953. In 1951, as a leading authority on metalworking equipment, he was "loaned" to the Department of Commerce's National Production Authority, where he served as chief of the industry branch of the metalworking equipment division over



continued

need DRIV-LOK grooved pins In SPECIAL MATERIALS?



aluminum

alloy steel-heat treated

brass

stainless-303 and 416

bronze

DRIV-LOK Pins — the positive locking, solid steel body grooved fasteners — are also available in a variety of special materials to meet particular requirements of strength, corrosion resistance, electrical qualities, or combinations of these properties. Like all DRIV-LOK Pins, they are carefully made to exacting standards, are easy to install and will reduce your fastening and assembly costs.

Write us, describing your fastening requirements. Recommendations made and catalog sent without obligation.

DRIV-LOK SALES CORPORATION

731 Park Avenue

Sycamore, Illinois

Use postpaid card. Circle No. 257

April, 1959



skill high - cost low by cold heading

Cold heading was the only method seriously considered for making this stud. It required exceptional skill to produce this part economically and still meet quality requirements.

By using special adapters on cold headers, Progressive evolved a low cost method for producing studs with sharp, well-defined corners and clean, rolled knurling on the stem to facilitate assembly.

Progressive can combine skill and economy for you, too — and give you naturally stronger fasteners. Write for more case histories in our "Bank Book of Savings in Cold Heading."

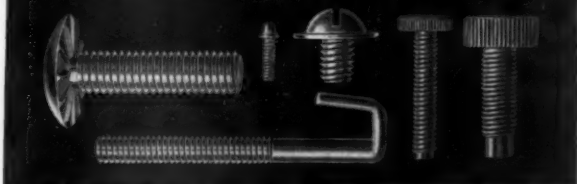
MACHINE SCREWS AND NUTS, SEMS FASTENERS, SLOTTED TAPPING SCREWS AND PHILLIPS HEAD SCREWS

THE TORRINGTON COMPANY

Progressive Manufacturing Division

40 Norwood Street • Torrington, Connecticut

SAVE ON PARTS LIKE THESE



AMONG OPERATIONS PERFORMED BY PROGRESSIVE are heading and extruding simultaneously; flattening; piercing; drilling; bending; pointing; fluted or diamond knurling; trimming; turning tenons, shoulders or recesses; struck or sawed slotting; notching.

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75

**▼ this machine will
drive up to
10 screws at
one time . . .**



... reducing assembly costs and improving quality. Built for high production jobs where a fixed set up is practical, this multiple spindle screw driving machine automatically feeds screws from a hopper and drives them to a predetermined torque. Evenly distributed pressure eliminates stresses caused by driving home one screw at a time. A simple sliding fixture positions work pieces accurately.

Machine illustrated shows application of multiple spindle screwdriving to assembly of electric power drills.

Send a sample of your assembly and a list of your requirements. We will be happy to show you how multiple spindle screw driving can be applied to your job.

COOK & CHICK COMPANY
2145 West 24th Street Chicago 8, Illinois

Use postpaid card. Circle No. 275

EXECUTIVES WANTED

An important growth Company in the fastener industry is seeking two men with considerable—major—potential for development above and beyond the middle management level.

This concern located in Connecticut is headed up by an ambitious, open-minded management. The Company prides itself on developing and using new and unusual cold heading and metal-flow techniques through the whole range of alloys and unusual metals. That's the technical side.

In its Company organization, management, and methods this company's aim is to out-manage the competition rather than play follow the leader. The newest management technology is at home here.

The Company will pay for talent. Salaries are generous. Moving expenses will be paid, of course, and incidentally your family will enjoy fine living in this pleasant New England city.

Here are the ideal requirements for these jobs—but again the Company is open-minded. 25 to 35 is the best age bracket. **Several years of close header experience and a thorough knowledge of header tooling is required.** A good working knowledge of secondary equipment is needed. (Your first assignment will probably be the supervision of several departments.) A Mechanical Engineering degree with MBA would be considered just about perfect. These men, because of the important plans the Company has for them, will be selected with extreme care. All correspondence and contacts of course will be kept completely confidential. Send complete resumé with a recent photo to:

TIMOTHY D. DESMOND & COMPANY
Management Consultants
BOARD OF TRADE BUILDING
CHICAGO 4, ILLINOIS

12 industry sections in the machine tool and metalworking field.

W. C. Denison, company founder, and until Norris' appointment, president of Denison Engineering, will remain active as chairman of the division, and will continue in his capacity as a vice president, director and a member of the management committee of the parent organization.

BRISTOL PROMOTES VANLEUVEN, MUELLER



VANLEUVEN



MUELLER

Promotions in the Socket Screw Div. of The Bristol Co., Waterbury, Conn. have been announced by H. E. Beane, vice president-sales. Ralph T. Mueller is now midwest regional sales manager, replacing W. C. VanLeuven who moves up to sales manager. VanLeuven had held the position since 1956 and Mueller had been St. Louis district representative for seven years.

ATOM CONGRESS-FAIR COMING IN APRIL

International attention will be focused during the week of April 5 to 10 on the Fifth Nuclear Congress and Atomic Industrial Forum AtomFair to be held at the Cleveland Public Auditorium.

now! get this NEW

problem-solving
money-saving

Setko Catalog 23 FREE



- INCLUDES NEW SELF-LOCKING SET SCREW SELECTOR CHART
- LATEST STYLES OF SOCKET SCREWS INCLUDING: BUTTON HEADS, FLAT HEADS, SHOULDER SCREWS, DOWEL PINS.
- COMPLETE INFORMATION ON THE COST-CUTTING SETKO HOPPER FEED METHOD OF INSERTING SET SCREWS.

Lists all standard set screws and socket screw products... plus many special types designed for unusual conditions of vibration; close precision setting; resistance to tampering, etc. Describes many specific ways in which Setko Set and Socket Screw products cut costs and improve product quality.

Partial Contents of New Setko Catalog 23:

- Hopper-Fed Headless Set Screws, with New Automated Feed System
- Self-Tapping Set Screw
- Standard Hexagon Socket
- Zip-Grip Self-Locking®
- Nu-Cup Set Screws®
- Self-Locking Offset
- Indicates Setko Set Screw "Firsts"!
- Point-Lok, Flush-Lok, Spread-Lok®
- Isothermal Heat-Treated Set Screws
- Stainless Steel Set Screws, Cap Screws, Button Heads, Flat Heads, Shoulder Screws, Dowel Pins and Pipe Plugs

Send for FREE catalog 23 today!

Set Screw & Mfg. Co.

Use letterhead—or write name and address in margin of this page, tearout ad and mail.

705 Main Street, Bartlett, Illinois (Chicago Suburb)

We Specialize in Solving Puzzling Set Screw Problems

Use postpaid card. Circle No. 280

Assembly and Fastener Engineering

Coordinated by the Engineers Joint Council and sponsored by thirty leading engineering, scientific and other associations, the Nuclear Congress will be composed of four parts: the Nuclear Engineering and Science Conference, the Hot Laboratories and Equipment Conference, the Atomic Energy in Industry Conference, and the AtomFair.

Under the theme "For Mankind's Progress" over 250 technical papers on peace time uses of atomic energy will be given.

The AtomFair, sponsored by the Atomic Industrial Forum, Inc., will be the nuclear industry's only major show during 1959. Well over one hundred exhibitors will exhibit the latest developments in industrial uses of atomic energy.

ALBANY PURCHASES ECKERT INVENTORY

Albany Products Co. Inc. of South Norwalk, Conn. announced the purchase of the entire inventory of stainless-steel screws of H. M. Eckert Co., Richmond Hill, Ltd. Over three million pieces, machined from bar, Class 3A fit are involved.

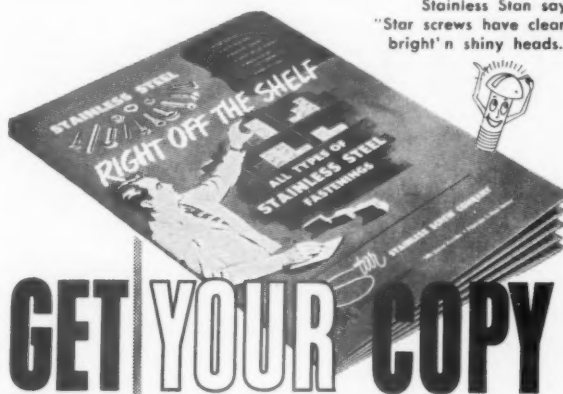
HUCK NAMES ENGINEERING REPRESENTATIVE

Paul J. Smith has been named engineering representative for Huck Mfg. Co., Detroit. Smith will assist district manager A. Joe Upton in providing sales engineering service to Huck customers in metropolitan New York, lower Connecticut and northern New Jersey.

A graduate of Rutgers University, his industrial experience includes four years with Elastic Stop Nut Corp. Prior to joining Huck, he had been assistant sales manager for Valcor Engineering Corp.



Stainless Stan says
"Star screws have clean,
bright'n shiny heads."



STAINLESS STEEL
300 & 400 Series

- AN Drilled Fillisters
- Bolts
- Cap Screws
- Cap, Socket Head
- Cotter Pins
- Dowel Pins
- Hinges
- Machine Screws
- Nuts
- Set Socket
- Sheet Metal Screws
- Stud Bolts
- Taper Pins
- Washers
- Wood Screws

STAR'S CATALOG OF *Right-off-the-Shelf*® STAINLESS STEEL FASTENERS

Save time . . . save money. This book lists over 7,000 stainless steel fastenings available for immediate delivery RIGHT OFF THE SHELF®!

Write for catalog on your letterhead TODAY.



STAR STAINLESS SCREW CO.

713 Union Blvd., Paterson 2, N. J.

Telephone CLifford 6-2300

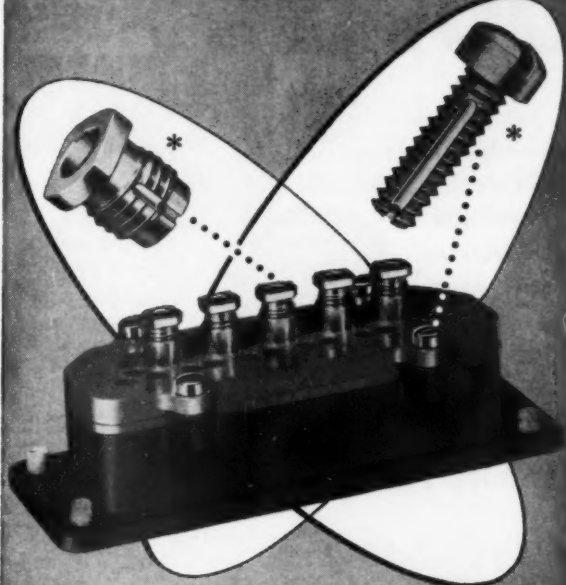
Direct New York City phone: Wisconsin 7-6310

Direct Philadelphia phone: WALnut 5-3660

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April, 1959

CANNON selects LONG-LOK self-locking screws*



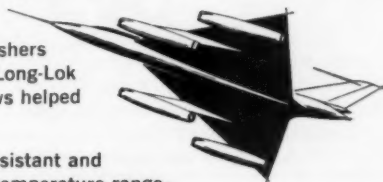
for first
all-magnesium
environmental
connector.

USED ON CONVAIR'S B-58

SUPERSONIC "HUSTLER"

Two of the prime requirements of this Cannon Electric connector were that it be lightweight and fully environmental.

Because they eliminate lock washers and safety wire, Long-Lok Self-locking Screws helped save weight.



Being vibration-resistant and spanning a wide temperature range, Long-Lok Self-locking Screws solved two important environmental requirements.

Whether you have critical or normal fastener problems, Long-Lok Self-locking Screws can speed and improve your assembly operations. Available for both aircraft and commercial applications.



Write for free Bulletin LL-58.

**LONG-LOK
CORPORATION**

2601 COLORADO AVENUE • SANTA MONICA, CALIFORNIA

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Gillen DOWEL Stock PINS

● Accurately Hardened

● Tolerances plus or minus .0001

● 2 Types-Boxed

● High Grade Steel

● Rust Resistant
Coating

Standard
Size
BLUE LABEL
for New
Precision Work

Oversize
Diameters
RED LABEL
for Re-Doweling
Enlarged Holes

STOCKED MANY LENGTHS &

WRITE FOR STOCK SIZE &

DIAMETERS

PRICE LIST

JOHN GILLEN COMPANY

Keying and Pinning Devices

2558 South 50th Avenue • Cicero 50, Illinois

A Subsidiary of Standard Railway Equipment Manufacturing Company

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BOLTS 'N NUTS FROM REPUBLIC



"Would you like to have us deliver it or will you take it with you?"

Adv. Republic Steel

Use postpaid card. Circle No. 264

CENTENNIAL FILM HONORS GARDNER-DENVER

A film "What's in a Name?" has been produced by Gardner-Denver Co. to show how a firm celebrating its centennial in 1959 grew from a one-room shop in Quincy, Ill., into a world-wide company serving the world's basic industries.

The 17-minute sound and color film describes the development of Gardner-Denver since its founding in 1859 with a governor for steam engines as its first product. Service to general industry is shown as air compressors and automatic machines are used for drilling, fastening and wiring on assembly lines.

The film can be obtained for showing without charge.

SALES CHANGES AT H. M. HARPER



BOYES



MANDELL

Eugene N. Mandell has been appointed district manager of H. M. Harper Company's Detroit sales office, announced the Morton Grove, Ill. firm. The new Canadian subsidiary, Harper Everlasting Fastenings, Ltd., will be supervised by Will W. Boyes, vice-president of the subsidiary. Boyes has been in the Rochester, N.Y. branch office for five years.



TESTING

for industry

- Specialists in fastener testing and analysis
- Qualification and evaluation programs to military & commercial specifications
- Standardization studies
- Fatigue - static - creep & stress rupture - environmental - metallurgical



ALMAY RESEARCH & TESTING CORP.

"first in fastener research"

3510 E. 14th Street Los Angeles 23, Calif.

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SPECIAL FASTENERS



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Formerly Connecticut Screw & Rivet Co., Inc.

CUSTOM DESIGNED To Lower YOUR Assembly Costs

- CLIPS DESIGNED & MASS PRODUCED TO ORDER — One-Piece Or Assembled; Special Stampings; With Or Without Sealers — For Automotive, Appliance, Electrical, Furniture, Hardware & Other Volume Users
- COMPLETE FASTENER LINE — All types of screws — Sems — Spinlocks — special cold headed products — Keps® — nut and washer assemblies — hollow stamped nuts — clips
- FASTENER ENGINEERING SERVICE — By Anchor's nationally recognized experts

Use postpaid card. Circle No. 266

BRAZED HONEYCOMB CONTRACT TO SOLAR

Solar Aircraft Company has received a contract totaling nearly a million dollars for continuing manufacture of all-metal honeycomb sandwich components for the B-58 jet bomber, C. D. Oberg, director of sales, announced.

The order calls for manufacture of 16 different structural sections for each aircraft set.

Solar has designed its own core-making machinery, special brazing fluxes and electronic brazing furnaces. Strips of stainless steel foil, thinner than a human hair, are formed into square, hexagonal or wave cell patterns on the machines. Blankets of the honeycomb core material are then placed between sheets of surface material and the sheets and core are brazed into a single rigid, lightweight structure.

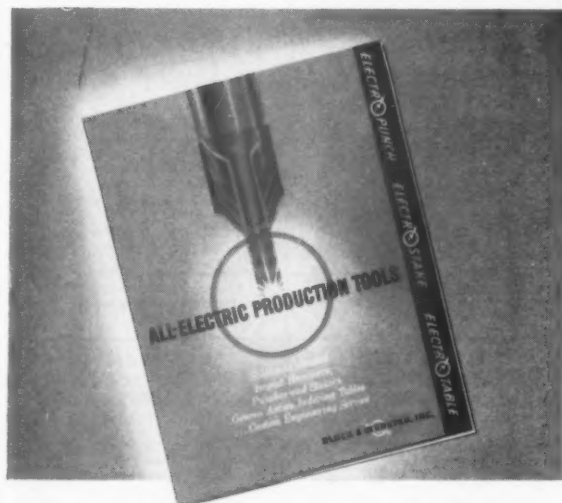
KEE KLAMPS OPENS U.S. HEADQUARTERS

Kee Klamps North America Limited of Toronto, Ontario, announced that U.S. headquarters have been opened at Buffalo, N.Y. The company manufactures malleable iron fittings for building frames, racks and railings.

LAMSON & SESSIONS EXECUTIVE DIES

Lamson & Sessions Co. of Cleveland announced the death of Robert G. Patterson, assistant to the president, at his winter home in Pompano Beach, Fla., on February 6th. He was 67.

Patterson joined Lamson & Sessions as merchandising director in 1935, rising to general sales manager in 1943 and a director in 1945. In 1948 he was elected a vice-president and in 1956 became assistant to the president.



Here are the fastest assembly tools in their class... introduced to you in this FREE catalog.

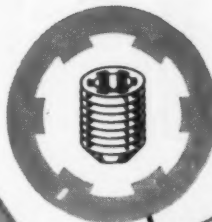
If you want to speed up production and cut costs in a wide variety of assembly operations requiring staking, crimping, swaging, riveting, peening as well as marking and punching, write for this new, complete Black & Webster catalog, describing the most modern, fastest all-electric assembly tools in their class. Write:

BLACK & WEBSTER, INC.
DEPT. 23, 445 WATERTOWN STREET, NEWTON 58, MASS.

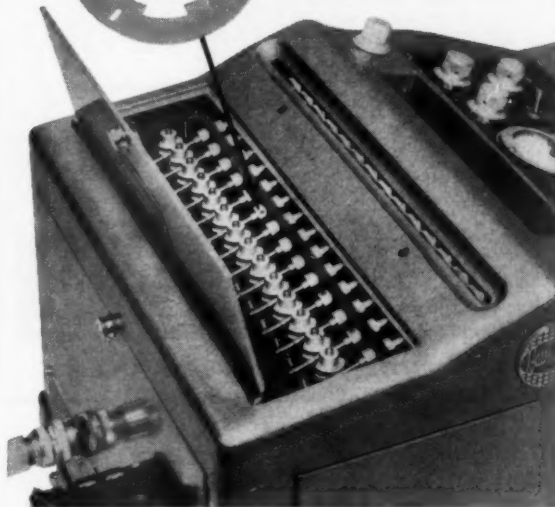
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April, 1959

Instrument designers use Multiple-Spline Set Screws



Bristol Multiple-Spline Set Screws couple worms to control shaft in precision adjusting mechanism of Hathaway Instrument Division's S-25 Oscillographs.



Hathaway Instrument Division of Hamilton Watch Co. picks Bristol-designed socket screw for "can't slip" applications

Engineers in Hathaway Instrument Division's Research and Development Laboratory have the job of designing multi-channel oscillographs and strain gage control units to exceptional standards of accuracy and reliability.

Gears, motor couplings and adjusting mechanisms of these precision instruments must not slip. Thanks to Bristol-originated Multiple-Spline Set Screws, they can't slip.

Because of their unique multiple-spline socket design, these Bristol screws can be wrenched up tighter. They withstand shock and vibration. They can be loosened and retightened thousands of times with no spreading of the socket.

Next time you're faced with a "can't slip" application consider Bristol Multiple-Spline Socket Set Screws. Or Multiple-Spline cap screws for extra holding power in fastening flanges and other parts together.

A.B.18

Precision socket screw manufacturers since 1913

Bristol's Hex Socket Screws

Bristol's Multiple-Spline Socket Screws

Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1 1/2" diam.

THE BRISTOL COMPANY Socket Screw Division
Waterbury 20, Conn.

Use postpaid card. Circle No. 268

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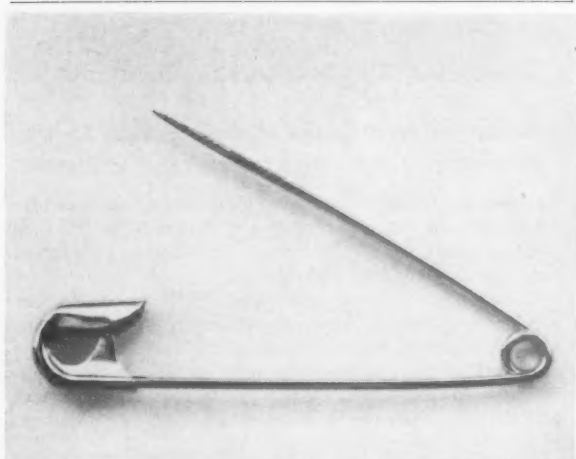


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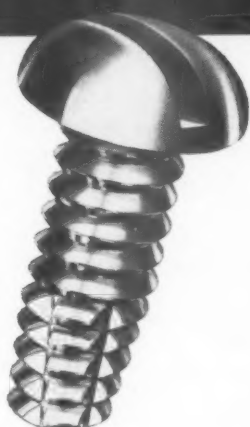
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2 "Pentap"... the new, Improved P-K Type B-F*

(formerly F-Z) combining the five thread-cutting flutes of the Type F screw with the coarse-pitch, widely-spaced threads of the P-K Type B. The thread-cutting "Pentap" Type B-F distributes cutting pressure evenly, lets chips drop to the bottom of the hole, and prevents cracking of material. It is designed for making fastenings to comparatively thin sections and bosses in friable and brittle plastics.



3 P-K* Type L†

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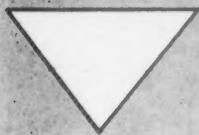
*Pat. - I Pending. †U. S. Patent 2,350,346.

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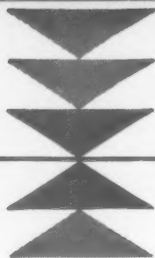
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ONE LAST WORD

WHEN IS A FASTENER NOT A FASTENER?



When is it hardware? Is a latch a fastener? Is a special gimmick which opens windows a fastener? An assembly? Or is it neither? As practical engineers you are not concerned with definitions and idle semantics. To you, each product is an integrated whole. Specific parts of this, or a phase of its manufacture is your specialized responsibility whether this be fastening a cover, holding a motor, a piece of trim, or closing a hood on an automobile. However, to the editors of this magazine the questions just posed are real and are demanding of an answer. Because some of our readers have queried us on this problem we want to give you our views.

The reader is the determining factor of what subjects are discussed in his magazine. In each industry, he has his own peculiar fastening and assembly problems. The automotive is pleased because we cover welding, the aircraft is delighted over bonding and riveting, the electronics readers like soldering, etc. In addition, some readers have additional unique interests which must be treated editorially.

Let's take the doors of automobiles. We can't have them flapping open every time there is a breeze. They must fasten easily, stay shut through wind, hail and snow storms, yet children must be able to open them. These are fastening problems! The same applies to refrigerators or airplanes. How would it do for the doors to pop open 20,000 feet above Lake Michigan and have all the passengers blown out of their seats and scattered far and wide? There

would be complaints over this fastening situation.

Try to convert a passenger plane to a cargo plane in a matter of minutes. A special fastening device holds the seats to the floor of the plane, a mere twist with a screw driver and the seats are freed, leaving the floor level for cargo. A clever fastening device, one of many such which exist in all types of industries. "Assembly and Fastener Engineering" must discuss them, and is even now gathering material for future articles.

A manufacturer of standard screws showed me a special little unit he had designed for opening, closing, and fastening windows. He said, "The fastener industry is getting more and more into small units of this type which do more than merely fasten, they also operate or perform a utility function." American industry is moving forward so quickly that many small components which were made piece by piece are now small sub-assemblies made by fastener manufacturers. These small assemblies combine a functional with a fastening feature. This sort of thing is gathering headway.

To serve the needs of our readers we must be cognizant of their problems in the area of fastening, joining and assembly. We must discuss them and report on the solutions. Whether the problems involve latches, special locks, unique sub-assemblies or merely plain screws or solder, they are important. They are the heart of reliability and in many cases can be a deciding factor in the eventual sale of the finished product.

Wm. J. Schleicher

Vice President & Editorial Director

Assembly and Fastener Engineering

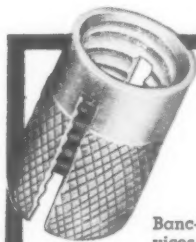


Bruce Nichols, director of purchasing — with an International Instruments' miniature Multitester in the foreground . . . with over a dozen Banc-Loks inside.

"Banc-Lok saves us \$1,000's every year!"

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Banc-Lok — ready to increase load-carrying capacities in plastics, woods and soft metals . . . wherever materials are too thin to tap, too soft for threads!

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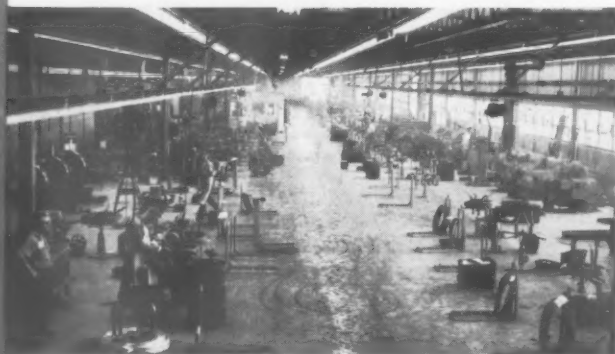


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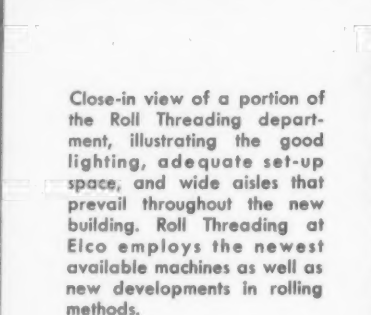


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A general view of the Header Department, which occupies a single vast room extending down the whole west wall of the main building. A comprehensive and versatile array of accurate, high-production cold-heading machines produce an unbelievable quantity of shaped blanks and finished parts every working day.



Close-in view of a portion of the Roll Threading department, illustrating the good lighting, adequate set-up space, and wide aisles that prevail throughout the new building. Roll Threading at Elco employs the newest available machines as well as new developments in rolling methods.



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